VOLUME 281 MAY 1952

CU/2-H04615-112-P015372

THE ANNALS

of The American Academy *of* Political
and Social Science

THORSTEN SELLIN, *Editor*
JAMES C. CHARLESWORTH, *Associate Editor*

371.606

112

THE FUTURE OF OUR NATURAL RESOURCES

Edited by
STEPHEN RAUSHENBUSH
Consultant to Public Affairs Institute
Washington, D. C.

CALCUTTA UNIVERSITY
CENTRAL LIBRARY

Copyright, 1952, by
THE AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE
All rights reserved

PHILADELPHIA
1952

CONTENTS

THE SETTING OF CONSERVATION

PAGE
Conservation in 1952 . . . *Stephen Raushenbush* 1
The Conservation Movement . . . *Robert O. Beatty* 10
The Citizen's Part in Conservation . . . *John H. Baker* 20

MINERAL AND ENERGY RESOURCES

Our Future Dependence on Foreign Minerals . . . *Alan M. Bateman* 25
What Is Involved in Metals Conservation Today? . *Howard A. Meyerhoff* 33
The Fuel Complex: A Projection . . . *George A. Lamb* 42
Adequacy of Our Mineral Fuels . . *Robert E. Hardwicke* 55
International Fuel Economy . . *Eugene Ayres* 73
Conservation of Hydroelectric Power . . *Paul J. Raver* 79

FORESTS

Private Forestry in Transition . . *Samuel T. Dana* 84
"Big" Versus "Little" Lumber Operators in the Pacific Northwest *Daniel L. Goldy* 93
Tree Farms Versus Regulation . *T. D. Stevens* 99
A Program for the Redwoods *Dewey Anderson* 105
Forest Policy for the Years Ahead . . . *Hardy L. Shirley* 110

SOILS

Soil Conservation and the Maintenance of Soil Productivity *Richard Bradfield* 118
Comparative Costs of Restoration and Reclamation of Land . *Paul B. Sears* 126
Economic Analysis of Land Use on the Western Ranges . *M. M. Kelso* 135
A Rounded Land Conservation Program *Charles M. Hardin* 146

WATER RESOURCES

The Work of the President's Water Resources Policy Commission *Robert G. Snider* 155
Water: West . . . *Morris E. Garnsey* 163
Water Supply—The Industrial East . . *Stephen Bergen* 172
Soil Conservation and Floods . . *Hugh H. Bennett* 181

GENERAL

Labor Looks at Conservation and Development . . . *Anthony Wayne Smith* 189
Conservation and Wise Utilization of Natural Resources in Canada *H. A. Young* 196

BOOK DEPARTMENT

PA
Baron, Salo Wittmayer. *A Social and Religious History of the Jews.* Part I: "Ancient Times." Melville Jacobs 2
Buell, Bradley, and associates. *Community Planning for Human Services.* Marietta Stevenson 22
Canoyer, Helen G., and Roland S. Vaile. *Economics of Income and Consumption.* Leland J. Gordon 214
Carr, Edward Hallett. *The New Society.* Vernon J. Puryear 238
Coates, W. P., and Zelda K. Coates. *Soviets in Central Asia.* Joseph E. Williams 259
Coon, Carleton S. *Caravan: The Story of the Middle East.* A. O. Sarkissian 261
Dangerfield, George. *The Era of Good Feelings.* Wilfred E Binkley 211
Davis, Ralph Currier. *The Fundamentals of Top Management.* John F. Mee 215
Donahue, Wilma, and Clark Tibbitts (Eds.). *Growing in the Older Years.* Elizabeth Breckinridge 226
Dublin, Louis I, and Mortimer Spiegelman. *The Facts of Life—From Birth to Death.* E. Douglass Burdick 224
Due, John F. *The General Manufacturers Sales Tax in Canada.* Mabel L. Walker 241
Duverger, Maurice. *Les Partis Politiques.* E. Malcolm Carroll 253
Einaudi, Mario, Jean-Marie Domenach, and Aldo Garosci. *Communism in Western Europe.* Arnold Brecht 256
Ernst, Morris L, and David Loth. *For Better or Worse: A New Approach to Marriage and Divorce.* Evelyn Millis Duvall 225
Fehling, Helmut M. *One Great Prison: The Story Behind Russia's Unreleased POW's.* Translated by Charles R. Joy. Oliver H. Radkey 250
Festinger, Leon, and Harold H. Kelley. *Changing Attitudes Through Social Contact: An Experimental Study of a Housing Project.* Martin P. Chworowsky 219
Fuchs, Stephen. *The Children of Hari: A Study of the Nimar Balahis in the Central Provinces of India.* W. Norman Brown 245
Galenson, Walter. *The Danish System of Labor Relations.* A. Morgner 257
Grassmuck, George L. *Sectional Biases in Congress on Foreign Policy.* Lawrence H. Chamberlain 207
Hallenbeck, Wilbur C. *American Urban Communities.* George S. Hart 208
Handlin, Oscar. *The Uprooted: The Epic Story of the Great Migrations That Made the American People.* Ralph Adams Brown 221
Hare, Richard. *Pioneers of Russian Social Thought.* David Mitrany 248
Harrison, John B. *This Age of Global Strife.* Dwight E. Lee 207
Heberle, Rudolf. *Social Movements: An Introduction to Political Sociology.* C. Hartley Grattan 221
Hedley, George. *The Superstitions of the Irreligious.* Erwin R. Goodenough 235
Hollis, Ernest V., and Alice L. Taylor. *Social Work Education in the United States.* Karl de Schweinitz 232
Hoover Institute Studies, Series B: "Elite Studies," Nos. 1, 2, and 3. Fritz Morstein Marx 249
Johnson, Gerald W. *This American People.* Crane Brinton 210

PAGE

KIEFFER, JOHN E. *Realities of World Power.* Andrew Gyorgy . 203

KORNER, EMIL. *The Law of Freedom as the Remedy for War and Poverty.* Translated from the German by H. Leigh Farnell. Bruce Knight . 204

KOTHARI, SHANTILAL. *India's Emerging Foreign Policies.* Robert Aura Smith 243

KRYLOV, IVAN. *Soviet Staff Officer.* Translated by Edward Fitzgerald. Paul B. Anderson 251

LASSWELL, HAROLD D., DANIEL LERNER, and C. EASTON ROTHWELL. *The Comparative Study of Elites.* Fritz Morstein Marx 249

LEONARD, V. A. *Police Organization and Management.* Bruce Smith . 211

LERNER, DANIEL, ITHIEL DE SOLA POOL, and GEORGE K. SCHUELLER. *The Nazi Elite.* Fritz Morstein Marx 249

LUZBETAK, LOUIS J. *Marriage and the Family in Caucasia.* Jessie Bernard 226

MIKESELL, RAYMOND F. *United States Economic Policy and International Relations.* Adolphe J. Warner 205

MILLER, EDWARD. *The Abbey & Bishopric of Ely: The Social History of an Ecclesiastical Estate From the Tenth Century to the Early Fourteenth Century.* Gray C. Boyce 236

MOLONEY, JAMES CLARK. *The Battle for Mental Health.* Robert A. Clark . 230

NANAVATI, MANILAL B., and C. N. VAKIL (Eds.). *Group Prejudices in India.* Paul F. Cressey . . . 245

NATIONAL BUREAU OF ECONOMIC RESEARCH. *Conference on Business Cycles.* Hans A. Adler . . . 214

PARSONS, TALCOTT, and EDWARD A. SHILS (Eds.). *Toward a General Theory of Action.* Henry A. Finch . . . 218

PERRY, J. HARVEY. *Taxation in Canada.* Marvel Stockwell 242

PHARR, CLYDE, THERESA SHERRER DAVIDSON, and MARY BROWN PHARR (Translators and eds.). *The Theodosian Code and Novels and the Sirmondian Constitutions.* Oscar G. Darlington 212

PIERSON, DONALD, LEVI CRUZ, MIRTES BRANDÃO LOPES, HELEN BATCHELOR PIERSON, CARLOS BORGES TEIXEIRA, and others. *Cruz das Almas: A Brazilian Village.* George E. Simpson 228

REDL, FRITZ, and DAVID WINEMAN. *Children Who Hate: The Disorganization and Breakdown of Behavior Controls.* George B. Mangold 227

RILEY, JOHN W., JR., and WILBUR SCHRAMM. *The Reds Take a City: The Communist Occupation of Seoul, With Eyewitness Accounts.* Narratives translated by Hugh Heung-wu Cynn. Morris Berzon . . . 260

ROWNTREE, B. SEEBOHM, and G. R. LAVERS. *English Life and Leisure.* Francis J. Brown 239

RUSSELL, BERTRAND. *New Hopes for a Changing World.* Gail Kennedy . 240

SAGE, GEORGE H. *Basing-Point Pricing Systems Under the Federal Antitrust Laws.* Vernon A. Mund 217

SCHUELLER, GEORGE K. *The Politburo.* Fritz Morstein Marx . 249

SCOTT, ANDREW MACKAY. *The Anatomy of Communism.* Harry W. Laidler . 247

SCOTT, JOHN A. *Republican Ideas and the Liberal Tradition in France, 1870–1914.* James E. Gillespie . 253

SHULIM, JOSEPH I. *The Old Dominion and Napoleon Bonaparte: A Study in American Opinion.* A. L. Burt . 211

PAGE

SMITH, T. LYNN, and C. A. MCMAHAN. *The Sociology of Urban Life.* Myron F. Lewis 223

SOROKIN, PITIRIM A. *S.O.S., The Meaning of Our Crisis.* Theodore Abel 220

Soviet Legal Philosophy. By V. I. Lenin and others. Translated by Hugh W. Babb. Harold J. Berman 249

STEPHENSON, GEORGE M. *The Puritan Heritage.* William W. Sweet 209

STERN, SIEGFRIED. *The United States in International Banking.* David P. Eastburn 216

TERRIS, MILTON, and NATHAN A. KRAMER. *General Medical Care Programs in Local Health Departments.* James P. Dixon 229

ULICH, ROBERT. *Crisis and Hope in American Education.* Newton Edwards 230

VAKIL, C. N., and P. R. BRAHMANANDA. *Planning for a Shortage Economy: The Indian Experiment.* N. G. D. Joardar 244

WACH, JOACHIM. *Types of Religious Experience, Christian and Non-Christian.* A. Campbell Garnett 235

WARBURG, JAMES P. *How to Co-exist Without Playing the Kremlin's Game.* William Henry Chamberlin 206

WEDGWOOD, C. V. *The Last of the Radicals: Josiah Wedgwood, M. P.* W. Henry Cooke 240

WIESE UND KAISERWALDAU, LEOPOLD MAX WALTER VON. *Gesellschaftliche Stände und Klassen.* Robert Scharf 255

WIETING, C. MAURICE. *The Progress of Cooperatives.* William H. Cartwright 234

WILSON, HOWARD E. *Universities and World Affairs.* William J. Ronan 231

WISE, GEORGE S. *Caudillo, A Portrait of Antonio Guzmán Blanco.* Russell H. Fitzgibbon 261

ZAVALANI, T. *How Strong Is Russia?* Harold C. Hinton 246

ZINKIN, MAURICE. *Asia and the West* Owen Lattimore 258

ZURCHER, ARNOLD J. (Ed.). *Constitutions and Constitutional Trends Since World War II.* Johannes Mattern 252

INDEX 267

The articles appearing in THE ANNALS are indexed in the *Readers' Guide to Periodical Literature* and the *Industrial Arts Index.*

Conservation in 1952

By Stephen Raushenbush

CONSERVATION is in danger of becoming a lost cause.

As a cause, rather than a series of techniques, it started with two ideas. The first was the concept of a national patrimony, a God-given heritage and legacy which was to be handled by responsible stewards rather than by prodigal and wastrel sons. The second was that the advantages of our natural resources should be shared by all the citizens of the nation, not used primarily for the benefit of a few.

Today the emotional content of these old ideas survives mainly among the small farmers who love the land which gives them their living. It is their group of soil conservationists that holds that "the right to own carries the duty to conserve." But for most of the rest of the community, the two moving ideas of Theodore Roosevelt, Gifford Pinchot, and the host of great conservationists of the early part of the century seem to have lost attractiveness. The cause that rose from these ideas has been weakened. This is not to say that many things are not still done in the name of conservation. It is not to say that there are few sincere recreationists, or few people worried about the pressure of population on land, or few diligent technicians of soil and forest conservation. They are all present. They are all doing valuable jobs of sorts. They are simply no longer so sure of their community of interest or so confident of the national value of their work as were the old-time leaders.

Contrary Forces

What happened? Some five distinguishable forces and events battered away at the old ideal.

First was the peculiar sequence of war-depression-war-defense that has extended over the past 38 years. The war and defense periods drained our resources at rates that were unthought of in the early conservation days. In those emergencies there was little possibility of considering slower rates of use. The greatest service to future generations seemed clearly to be that of mobilizing all our resources as rapidly as possible. Sandwiched between war emergencies was an agricultural, coal, and lumber depression that began in the middle 1920's. Owners and tenants had to exploit the land, the forests, and the coal in destructive ways to stay alive. They had few funds to maintain the national resource capital. Dust storms then transported topsoil from the Midwest to Washington, and a few starts were made (the Civilian Conservation Corps and the Soil Conservation Service) toward belated conservation; but then war and defense claimed the national surplus. In this whole sequence of war-depression-war-defense it became easier to preach conservation than to achieve it, and easier to ignore it than to preach it.

Second was the demonstration of the ability of our applied scientists to produce substitutes or find alternate sources. When lumber became scarce, light metals and useful clay products were available. When good range for our sheep became scarce, synthetic substitutes for wool appeared. As the soil resources were depleted or eroded, a host of seed, insecticide, and fertilizer improvements produced larger crops on less land. Internal combustion engines made land available that had previously been used for the maintenance of horses and mules. When the more easily discovered petroleum resources approached exhaustion, new geophysical devices led to the discovery of other supplies. The popular faith now is that science will do everything for us, including the saving of our energy for more important purposes than the conservation of natural resources.

Third was the discovery that our exhaustible resources (conspicuously petroleum and high-grade iron ore) could be supplemented expeditiously and economically from abroad. The Rockefeller Board's report in 1950, ***Partners in Progress,*** pointed out that our heavy industry was dependent on imports for most of fifteen basic raw materials. It recommended American aid for development of these foreign necessities. We could become another England, importing raw materials, fabricating them, and exporting finished goods.

Not only did other world resources become available to us, while our financial position made it quite possible for us to obtain them on favorable terms, but international trade became more clearly a good and desirable thing. As a minor corollary, conservation of domestic resources in the sense of slower use, or use for higher-value purposes, seemed to become less important for our survival, or even, at the worst, another interference with international trade, world stability, and possibly peace.

Next was the fact that the nation experienced a fairly high standard of living, and during the past ten years an extremely high one, in spite of all the conservation failures and the heavy resource drains for war and defense. Prices of natural resources rose—some of them conspicuously above the general level—but increased incomes absorbed them without very much trouble, and were still high. These higher resource prices did not take us out of world markets for our finished goods. The organization and ownership of some resources became somewhat more concentrated; special tax privileges had to be given in order to induce oil and other mineral discoveries. Still, the benefits of the whole economic arrangement were largely shared—if not directly, then indirectly.

In the face of this situation, attention to the dark warnings of the prophets of shortages of land, oil, coking coal, and metals, of monopoly and of lower living standards, seemed both postponable and shiftable to those obviously benighted areas where population was more clearly pressing on resources.

It was only when the floods came roaring down the Missouri or the Kansas or the Ohio, or when material shortages inflated world prices disastrously, or when the threat of losing Middle Eastern oil resources appeared, that we had cause to remember the black prophecies. And these occasions did not come often. By and large, the people of the nation seem to have done extremely well, in spite of some serious neglects of the future and an accumulation of local ghost towns, eroded areas, and inflationary pressures circling out from raw materials.

Finally, the conservation ideal ran afoul of the fear that it might lead to too much governmental control. Even those who recognized clearly that the interests of time and society were not necessarily identical with the operations of the free market could also see that governmental action was not always a perfect solvent.

QUESTIONS OF FACT

The impact of these five happenings has been heightened by a number of disturbing questions about fact. The estimate of the United States Bureau of Mines that our coal reserves would last for many hundreds of years has been questioned in terms of the high costs of producing most of the reserves. Its figures that gasoline can be produced from coal at a cost of 14 cents a gallon have been challenged by the assertion of various industry groups that it may cost several times that much. The figures of the United States Forest Service indicating that our lumber and pulp supply is already inadequate for our needs and is growing more inadequate have been questioned sharply by the wood industries. The estimate of the Soil Conservation Service that we need to restore or rebuild several hundred million acres of rapidly or slowly eroding land has been doubted by technicians who put their trust in the methods by which production could be increased on the remaining land base. The United States Weather Bureau has expressed public doubts about the value of much of the cloud seeding that is now being undertaken in the arid West.

The confusion has been increased by the absence, from the end of World War I onward, of any common grouping of the various conservation interests. The conservation movement, like so much else in modern society, has been atomized. There are many separate groups, each devoted to some special purpose. But there has not been any inclusive association that attempted to find the similarities of all the resource situations, think out the major problems, and deal with them, or even to keep track of what were facts and what were special pleadings, and inform the public accordingly.

PAST AND PRESENT

To explain why conservation today is not quite so appealing a cause as it was in the first decade of the century is not to question the two ideas of wise use of a national patrimony and wide distribution of the benefits of that use. Those ideas are necessary for a nation that intends to survive and for a society that wishes to become a community. We shall come back to them in due time.

That time may come sooner than we now think. The scars left by the depression of the 1930's are so deep that it is hard for us to comprehend that we not only are out of it, but shall probably not again see anything of its magnitude of severity in our lifetime. Instead, we shall more probably see the growing population, the increasing demand, and the generally rising prices that can call for emergency conservation practices, as well as enable the resource owners to undertake them.

What the nation did for the major resource industries during the depression was conservation only in the life-saving sense, not in the sense of assuring stabilization of the land or forest base, or less wasteful physical recovery of minerals. The petroleum industry was allowed to step a little outside of the free market system by state-approved limitations of production. The agricultural industry moved out of it along the more difficult road of taxpayers' help to take surpluses off the market, the coal industry temporarily by a minimum price arrangement, and the forest industries, briefly under the National Recovery Administration, by price maintenance.

It was recognized at that time that many small farmers, coal mine operators, oil producers, and lumber companies were, in effect, outside of the business system. They could hardly be expected to act with foresight. They were not institutionally equipped to fend for themselves. They did not evaluate their own labor or their family labor at the market rate, nor withhold their products until price justified their efforts. They sought to maximize their incomes by maximizing production, gutted their resources in that endeavor, and were overwhelmed by the consequent glut. They had no credit resources to do otherwise. The social costs of overcutting and soil mining were loaded off onto their downstream neighbors, and later onto the general taxpayers.

The national consent that was given for these various breaks with the free market system did, along with other factors, result in higher incomes for resource owners, and these were recognized as a prerequisite for conservation. The gains to society from these actions became clear as the war and postwar demands grew. However, the gains could have been greater if good conservation practices had been a basic rather than a perfunctory part of the process of consent.

Since those days a considerable amount of conservation work has been done. It looks small against the backlog of things undone, but it is promising, in parts. The Southeast, for example, is a much greener and more prosperous-looking place than it was twenty or more years ago when it was still in the cotton rut. A large number of Soil Conservation Districts have been formed, and many of these are getting some work underway. The Bureau of Reclamation is saving a considerable number of older irrigation districts that have overused their water supplies. The United States Forest Service and the Bureau of Land Management have been able to make a small start on reseeding some of the public range. The Soil Conservation Service has at long last been able to undertake work on a dozen smaller watercourses.

All this is a fair start, but when it is put next to figures for private and public investment that may go as high as $25 billion for forest and soil work, $10 billion for reclamation work, and $60 billion for water control work, it looks small and inadequate.

NEEDS, PRICES, EFFICIENCY

Conservationists are bedeviled by three main questions whenever they look at that backlog. The first is, How is the national need to be met at reasonable prices when resource owners (particularly the small ones) refuse or are unable to adopt good conservation practices and the higher immediate costs that attend them? The answer found in the wood industries seems to be that it is not so to be met. The United States Forest Service finds that the cutting practices are still bad on about 60 per cent of the private forest land, and that the supply will be much less than the demand at reasonable prices for many generations to come. In addition, the social costs of clear-cutting, in the form of erosion and downstream flood damages, are still largely paid by others. The United States Forest Service has suggested state control, but if that fails, federal control, of cutting practices and reforestation. The woodworkers and the Congress of Industrial Organizations think federal control of both is necessary. The lumber and pulp industries oppose both suggestions. There has been almost no major public discussion of the matter in Congress for almost a decade.

The second question is, How can the governmental part of the conservation job be done efficiently? It was to this question that the Hoover Commission and the Cooke Commission (Water Resources Policy Commission) largely addressed themselves. The former aimed its heaviest guns at the competition between the Army Engineers and the Bureau of Reclamation in the Missouri Basin. It recommended uniting them into one agency to get rid of a rivalry which was carried on at the expense of the conservation ideas. Hardly was the ink dry on its report before the Department of Agriculture produced a conservation program of its own for the Missouri Basin. Without saying so, that report indicated a belief that hardly any of the basic soil and forest conservation work that was needed would be covered by the other agencies. Another $4 billion of private and public investment was required to meet those needs in addition to the water control projects (which may cost $6 billion) already authorized by Congress.

Considerable emphasis was added to this second question as a result of the Kansas and Osage River floods of 1951. For almost the first time, the people of the region who were interested in upstream conservation protested the emphasis laid on, and the money to be committed to, large flood-protection dams that did little or nothing for the farmers and upstream communities. The connection between forest and soil conservation and downstream water control had rarely been clearer. It was also the burden of the two thousand pages of the Cooke Commission's report: only in unified watershed work was there any efficiency, any maximizing of social benefits.

Another part of the answer may well lie in government aid in establishing credit facilities for small owners, that are tailored to the needs of soil, forest, and water conservation.

FOR WHOSE BENEFIT?

The third question is, For whose benefit should national aid to conservation and development be undertaken? This presents itself for answer in several forms. One of them relates to the big cities that have expanded into the natural flood plains of the rivers. Now they want their buildings in those flood plains protected at national expense. The more they have expanded into them, the more money they need. Every extra group of buildings in the flood plains becomes a justification for extra hundreds of thousands of dollars of flood control works—a fact which explains part of the $60 billion figure for future water control. To some conservationists this seems like putting a reward on carelessness. Should the process be allowed to go on? Should this aid be given free; or should the cities pay part of the costs? The corollary questions are underlined by the probability that Congress will, in our time, never have unlimited funds, and that each protective measure is at the expense of some other one, elsewhere.

The question also frequently takes form around the acreage limitation. In 1902, in the Reclamation Act, Congress apparently intended to declare for a wide sharing of the benefits from the use of national resources in the form of land or funds. It said that irrigation water obtained through the use of these funds should go only to 160 acres within one ownership. The social ideal of the time was the family-owned and family-operated farm, and it seemed that 160 acres of irrigated land, coupled perhaps with some nonirrigated land, was enough for a respectable living in the American way of the time.

Many of the owners of land in old irrigation districts that were developed before or independently of the Reclamation Act have overused their water supply. They now want federal loans and grants (reclamation works) to get more water on their land. Without the extra water, their land will lose great value. But they have established large properties, and they object to selling some of their land to veterans or to other newcomers who want to start in. They ask that the sharing provision be put aside. The more they have overused their water supply and let their properties run down, the more they need government funds and the less they are willing to accept one of the two conservation purposes of those funds. The reward for neglect is to be large.

Before the public are also the Army Engineers and the Bureau of Reclamation. The former, moving upstream into competition with the Bureau on King's River and elsewhere, are able—because of a legislative lag—to offer the large landowners water without the requirement that the old conservation idea of sharing benefits be observed. In order to stay active in that region the Bureau may yet be forced to rise above principle and find competitive ways of its own to undo the intent and action of Congress as expressed in the Reclamation Act.

This type of erosion of one of the two original conservation purposes of that act seems to be a matter of indifference to the administration and Congress. Yet once the breach in the basic act and purpose is made, at King's River or on the older developments, the whole process of obtaining a social gain from the use of public funds and other resources is soon flooded out. Much of the justification for the use of public resources goes downstream with it. The question is bound to be raised: Why devote public money in ways that will cause the growth of factory farms, as long as there are more socially valuable conservation purposes to be served elsewhere?

"UNFINISHED BUSINESS"

The unfinished conservation jobs pile up in numbers and in size if we are once convinced that growing population and increasing industrialization both at home and abroad and consequently an expanding demand, along with generally higher prices, are our lot for the next quarter- or half-century.

The articles in this issue of THE ANNALS indicate a good number of those jobs. There is a high probability that we shall not be able to escape the stringencies involved and a consequent slowing-down of our rising standard of living without looking a little more closely at the end use of some of our natural resources. Conservation of materials for the essential needs may have to be obtained at the expense of the less essential parts of the economy. This is obviously the least desirable and most difficult way to conserve, but we may have to face up to it.

Minerals

In minerals, for example, practically none of the long-term predictions that take account of foreign supply and demand as well as our own allow us to think of an adequate supply at the relatively low prices to which we were once accustomed. Is it unreasonable to think about channeling available supplies to those places where they will make the greatest contribution to our economic growth? Can the producers of nickel and chrome, for example, find some way of diverting those metals away from luxury display on automobiles to more vital parts of our industrial organization? The conservation gain could be considerable, and perhaps more than could be accomplished through more expensive forms of conservation in primary and secondary recovery.

In addition, is there not some better conservation and supply method than the one which we are applying to marginal mineral operations? Copper is one illustration. In an emergency we pay premium prices for the production of high-cost Michigan copper. Without them it could not be produced. When the apparent emergency is over, the mines are idled and flooded. Large loans plus premium prices plus years of manpower and delay are needed to get them into operation again. Surely this is not the best process that can be devised by the mind of man. With a more or less permanent world copper shortage for the rest of the century, there seems to be some room and place for discussing the possibility of a more continuous multiple-price system.

our failure to grapple with them more thoroughly.

Findings by specialists

Specialists can contribute a great deal. It would seem highly desirable, for example, that the distinguished deans of our colleges of forestry be asked to sit together and sift out the truth and the facts in the controversy about the extent of bad cutting of our forest resources, and in the even more important related controversy about the supply-demand-price situation that we may expect within the next generation or so in forest products. That would be a very considerable national service, and should be undertaken promptly, with resources adequate to cover the field. It is long overdue. The nation certainly has a right to know, beyond what may be the self-interested claims of government officials or of industries, what the situation really is.

But specialists, as they themselves will readily admit, are not enough to provide all the value judgments that the nation needs. The problems are complicated, and in the end the whole society has to decide the purposes for which natural resources are to be used, and the costs which it is willing to pay to achieve these purposes.

Synthesis by learned and professional societies

In the premises, which include the present atomization of the conservation groups, it would be exceedingly helpful if the learned and professional societies were to take on this task. They would, first of all, have to go pragmatically, resource by resource, into the question of whether there is a dichotomy between society and time on the one hand, and the immediate interests of the resource owner on the other. When there is a serious difference, they would have to see what social engineering could be developed to reconcile both private and public interests. For those purposes they would need to group some of their ablest and most disinterested people together for quite a while. They would need to draw heavily on the resource owners and workers for counsel, and on the experts for work. They would need to take into account the international role, whatever it is, that Congress and the administration want the nation to play, and the demands on our resources involved in it. They would have to do some very independent thinking of their own.

Their findings would, I believe, carry far more weight with everybody, from the smallest farmer to the oldest senator, than the studies and thinking of either industry or government bodies; for they would be dependent on, or beholden to, neither. If they did their work well, the economy and the people of the nation would be the great gainers.

When they were through, a somewhat more united and deeply rooted conservation movement might be able to grow up, and that, too, would be helpful to the nation.

Stephen Raushenbush, Washington, D. C, is a consultant to the Public Affairs Institute. He was a member of the Preparatory Committee of the United Nations Scientific Conference on Resource Conservation and Utilization, and delivered the paper on Major Problems of Conservation and Development (1949). He was a senior resource economist in the United States Department of the Interior, 1937–47. He is the author of articles and studies on conservation problems, including Our Conservation Job (1949), The Ruhr (1949), Conserving and Developing Our Natural Resources (1950), and Better Conservation Work (1952). He is also the author of The March of Fascism (1939). He has in preparation a book on world resource patterns.

The Conservation Movement

By ROBERT O. BEATTY

THE word "conservation" has come to signify a concept of human activity with all the characteristics of a true social movement. Like all words which are not self-defining or -delineating, its use has, however, become subject to widely varied interpretation and misuse to suit the needs and desires of assorted groups and individuals.

Even when used in its most common area today—that of husbanding natural resources—the strict dictionary definition is not a true reflection of intent of those groups and individuals which are concerning themselves with conservation, since it connotes a bottling up of resources without use.

SIGNIFICANCE OF THE TERM "CONSERVATION"

As commonly applied by professional conservationists and for the purposes of this paper, conservation means development, with wise use or management in the best public interest, of our natural resources of soil, water, vegetation, wildlife, and minerals. It means further the restoration to sustained productivity of worn or damaged resources, where possible, and the management and utilization of renewable resources in such manner as to guard against depletion. Only in a limited field of activity, including the safeguarding of special reservations such as parks or established wilderness areas, does the connotation of preservation apply to an appreciable extent. Otherwise, it might best be summed up as meaning "to use without using up."[1]

We should not, therefore, accept the use of the term "conservation" without inspection of the scope or application intended in writing or speaking the word. For example, there exist many so-called "conservation clubs" whose chief interest is the harvest of fish and game, but whose activities make little, if any, contribution to the conservation of these resources. The bare fact that a man hunts or fishes does not, as the general public is inclined to assume, make him a "conservationist."

The term "conservation pool" is employed by the large dam building agencies of the Federal Government to designate the residue of water left in reservoirs, beyond which they will not be drawn down or depleted. By interpretation, such a pool may be appropriately named. To an observer but casually familiar with the broad aspects of conservation of resources, however, the term "conservation pool" would seem to employ a use and management of land and water definitely in the public interest, whereas quite the reverse may be true if the pool itself has been created at the expense of other public values such as productive agricultural land, fish and wildlife crops, or recreational and scenic resources.

Anyone wishing to familiarize himself with the ideas, ideals, and activities of the conservation movement as I have attempted to define it here should, therefore, be quite circumspect in his acceptance of the term, as well as in his own use of it.

---

[1] The problem of conserving the nation's mineral resources has received the least attention from the organized conservation groups to date, and then not so much in the interest of the minerals themselves, but more to conserve other resources which outmoded mining laws allow to be exploited. The conservation of mineral resources is tremendously important, of course, but beyond control of the rate of use and manner of taking, little can be done.

CONSERVATION AS A "MOVEMENT"

Dr. Carl C. Taylor, head of the Division of Farm Population and Rural Welfare, Department of Agriculture, has characterized, quite accurately, I think, resource conservation activities in the United States as a true social "movement" brought about by the need for economic adjustments compatible with the pressures of increasing population on limited resource wealth.[2] He points out that it is only beginning to take the form of a "people's movement," it heretofore having pretty much been propounded and supported by the scientists and technicians. As with all movements, it will not get very far unless it *does* become a full-fledged people's movement. A sizable number of lay organizations, mostly operating without profit and concerned with defending the public's interest in one or another natural resource, are currently in existence. Drawing membership from all walks of life, they are giving continuity, organization, and effectiveness to the task of conservation as a people's movement.

To the majority of the people, including many responsible and astute lay and professional leaders, the fact that conservation has actually achieved "movement" status and is rapidly growing in energy and influence will come as something of a surprise. This is not to their discredit, for it seems a fundamental characteristic of human nature that we concern ourselves only with those matters which affect or contribute directly to our wants, desires, or experiences.

It is difficult, for example, for the furniture dealer to comprehend, except in general terms, that the net figure in his monthly profit column is tied inescapably to a perpetual supply of timber resources of a quantity and quality suitable to maintain his line of chairs and tables. He looks and thinks no further than his supplier, and is seldom conscious of the fact that the method of harvesting a forest a thousand miles from his plant may have an important bearing on whether his company will be solvent ten years from now. In far too many cases he still doesn't care, to be sure, and is contributing little to ensure the perpetuation of the resources from which he draws his living.

Similarly, the average housewife, concerned with the day-to-day tasks of raising a family, going to market, preparing the meals, and many others, is alarmed at the price of hamburger (or steak, as the case may be!). But she is often unconscious of the fact that the way a rancher in Wyoming is utilizing publicly owned grasslands may ultimately have a bearing on her food budget; or, for that matter, that the supply of water coming from her tap is influenced in quantity and quality by how a farmer fifty miles away plows his furrows. A similar analogy can be drawn for almost any endeavor in our society, regardless of the product or service rendered.

I cite these oversimplified examples by way of challenging the student of economics, sociology, and politics to show me a single material item satisfying our physical needs, a single emotional sentiment, a single moral or spiritual thought or idea—in short, a single activity or belief of man in any field which is not directly or indirectly dependent upon or conditioned by the continuing supply, or absence, of a basic physical resource. All of these must stem from the soil, the water, the air, and the sunlight. We can do little about the air and the sunlight; the conservation idea with all it portends is fundamentally concerned with maintaining and continuing a useful supply of soil and water and the resources which flow from them. It is as simple as that.

---

[2] Carl C. Taylor, "Conservation as a Movement," *Journal of Soil and Water Conservation,* Vol. V, No. 3 (July 1950), pp. 103–5.

WHAT MAKES A CONSERVATION CONTROVERSY?

There are many and diverse opinions as to what are the best uses or methods of use of the soil and the water and their products. Therein lie the resource controversies which, in essence, are largely differences of opinion, or differences in interpretation of facts and their application. Both amount to about the same thing, and always bring the same results; that is, battles in which the conflicting views are aired publicly and which are usually resolved in favor of that side which can bring the most political, economic, or social pressure to bear. In many cases (with some notable exceptions) these controversies revolve around who shall have superior rights to natural resources held and administered in the public trust—the general public, or some special interest group or individual pressing for economic advantage. The notable exception is the difference of opinion between informed segments of public and government over the best use and development of our water resources.

This is one of the chief conservation problems, and perhaps the most controversial one, facing the nation today. The soil also is involved because, in management, land and water are virtually inseparable.

THE WATER PROBLEM

On one side are the adherents of federal control of water resources through huge multiple-purpose river basin developments, some on the pattern of the Tennessee Valley Authority, wherein the government decides the highest use of a given natural supply of water (power, irrigation, navigation, domestic supplies, recreation, or a combination thereof), decides how it shall be developed, who will get how much, and at what price. This is sometimes referred to as government "paternalism," and sometimes it is called "socialism." The effect is the same, whatever the term.

The other view, and one most closely approaching that held by the active and most widely recognized conservation groups concerned with the public interest, is pretty well summed up in the general conclusions of a report on the nation's water problems prepared by the Engineers Joint Council, composed of representatives of five of the nation's top engineering bodies. This report states:

> Consideration and control of the waters of the U. S. are in the national interest, but not necessarily a function of the federal government. On the contrary, that which can be done by the individual should be done by him and that which requires collective action should be done at the lowest governmental level practicable. The federal government should engage in the conservation and control of waters only when the collective action of all the people of the nation is necessary for accomplishment of objectives.[3]

In essence, these divergent views place the conservation organizations, most technical engineering talent, and most American business on one side of the fence, and the Army Corps of Engineers, the Bureau of Reclamation, and the other power producing and administrative agencies of the Federal Government, their respective lobbies, and advocates of valley authorities on the other. It is a striking example of how conservation problems delve into and are affected by the political and social affairs of the nation; it is one of the many conservation problems which will only be solved when the people become sufficiently informed and aroused, one way or the other, to assert their collective political and social influence.

---

[3] Engineers Joint Council, *Principles of a Sound National Water Policy* (New York, July 1951), p. 20.

There are already built, being built, or authorized by Congress, federal dam building projects to cost more than 50 billion dollars. The Task Force on Natural Resources of the Hoover Commission reported extensively on the waste and duplication going on in the government's water development program, chiefly by the two agencies named above, and all at great cost to the taxpayer. This seems as yet to have had little effect, however. No legislation has been enacted, and little constructive revision of attitude and procedures has taken place designed to correct the objectionable practices pinpointed. Nor has much attention been given, up to now, to another factor that appears to be of growing importance—the annual recurring losses of foods and fibers which can *not* be produced from flooded acres.

One case history will serve to illustrate the point and show reasons for the considerable interest developing over this factor.

Far down the list of projects planned by the Army Corps of Engineers under the Pick-Sloan plan for the Missouri Basin is the Tuttle Creek Dam to be built across the Lower Blue River which flows out of Nebraska and joins the Kansas River at Manhattan. The reservoir would inundate 55,000 acres, and is proposed on the basis of flood control and sewage dilution benefits to Kansas City. At 1949 prices, the construction cost was $68 million.

The Army capitalized on the impetus given flood control activities by the July 1951 floods along the Kansas River, and dusted off the Tuttle Creek plans. Congress was asked for $5 million to start construction. The story of potential losses was then made generally public. It was shown that the Army anticipated $3 million annual benefits downstream, from flood mitigation and sewage flushing. Local residents had canvassed their neighbors in the 55,000 acres and determined from actual sales and appraised values that annual recurring losses in foods and fibers amounted to $6 million—more than twice the benefits claimed.

If the Tuttle Creek reservoir area may be taken as average, and fifty years considered a normal economic life of reservoirs under present eroding and silting conditions, the total national loss in foods and fibers from nonproduction would be in the neighborhood of $250 billions as a result of the construction of the $50 billion of dams and reservoirs authorized or built. Economists and engineers, after exhaustive calculations, might produce a different figure, to be sure. It seems certain, however, that the losses from this cause will be tremendous—this in an era when it is increasingly doubtful whether the foods and fibers can be spared from America's pantries and storehouses.

POLLUTION CONTROL

Another broad area of conservation interest, again having to do with our water resources, is the problem of how to control the assorted wastes of a growing economy which are all too often still deposited in the most convenient watercourse, be it by municipality (sewage) or industry (a wide variety of either toxic or "nuisance" effluents). The problem here is the twofold one encompassing, in broad generalities, public health (sewage wastes) and the recreational and other use benefits of clean waters (sewage and industrial wastes).

Much progress has been made in recent years in this field, with industry particularly coming to take a more enlightened view of its responsibilities with regard to its use of public water supplies (general speaking, all surface water supplies belong to the public). There are still, to be sure, some 22,000 sources of pollution in the United States, divided nearly equally between 11,800 municipal sewer systems and 10,400 independent factory waste outlets.[4] More than two-thirds of the industries surveyed by the Water Pollution Control Division of the United States Public Health Service have reported that water pollution control conditions are either unimproved or getting worse. The waste from municipal and industrial sources together which is still discharged into our waters equals that from over 150 million people! About $500 million is necessary to do a thorough clean-up job on municipal pollution alone.

Nevertheless, under Public Law 845 (the Taft-Barkley Water Pollution Control Law), passed in 1948, a definite policy has been established by the Congress to deal with pollution matters. This is a necessary development of jurisdiction; for since watercourses do not conform to political boundaries, intervention by the Federal Government is required.

Controversy in this field is now largely restricted to local differences of opinion between the public and the polluter as to how fast a given municipality or industry should get its clean-up job done. In rare cases is it still a question of whether it *can* or should be done.

PUBLIC LANDS

Another broad area of conservation interest involves several natural resources; it concerns the best and wisest management of our vast public estate. The Federal Government owns and administers, ostensibly in the public interest, some 500 million acres of the land and water area of the United States and it territories. This land includes 89 million of the 461 million acres of commercial forest land and contains more than one-third of the nation's supply of standing commercial timber. Another 250 million acres is in range where one-fifth of the cattle and more than half the sheep raised in this country spend a part of their lives.[5] Administering these lands are such agencies as the United States Forest Service (106 million acres), United States Park Service (16 million acres), United States Fish and Wildlife Service (4 million acres), and the Bureau of Land Management (180 million acres).[6]

One controversy which reached heated proportions in 1947, and is by no means a closed issue today, concerns the nearly 180 million acres of public domain in the western states which a small minority of livestock operators have eagerly sought to control for their grazing. Initially, they proposed that the land be sold to them by the government. This proposal was effectively defeated by the conservation groups. Currently they are proposing that the government grant them additional concessions which appear to amount to virtually exclusive authority to graze national forest range lands ***without*** concurrent responsibility for maintaining the productivity of these lands or safeguarding other uses (including watershed protection, timber, and recreation).

Another conservation problem of some magnitude involving public lands has to do with private ownership within our national parks and monuments on which anything from a tavern to a pig ranch can be, and often is, operated. Some 500,000 acres within our national parks are still privately owned, and in many cases these lands are being employed in a manner detrimental to the public values for which the parks were created. The problem of safeguarding for scientific and recreational use the ½ of 1 per cent of our land and water area which can still be classed as wilderness is also concerning conservationists in a great many areas.

---

[4] Public Health Service, *Water Pollution in the United States* (Washington: Government Printing Office), Part 2, p. 15.

[5] "Management of Public Land Resources," *Yale Law Journal*, Vol. 60 (March 1951), p. 455.

[6] *Area, in Acres of Lands in Federal Ownership*, Report No. 3116, 81st Cong., 2d sess., H. R., pp. 7, 8, 10.

Arguments on into the night could be developed around the wisdom of federal administration of such huge chunks of land. The record of development and use of forest and land resources privately held has been such in our short history, however, as to raise serious questions as to the wisdom of unbridled free enterprise in the exploitation of resources in the public domain. It is generally believed by students of conservation that the public interest in these resources must be safeguarded for the long-term good of the nation. To date this has taken the form of administration by federal agencies. This is not ideal, by any means, because of tendencies toward bureaucratic empire building and political "trading" which seem characteristic of the existing system. Nevertheless, the public still has a measure of control through pressures properly applied, and until a better plan comes along, it will have to do.

FOREST CONSERVATION

In forest management there have been significant trends and occurrences in the last three or four years which indicate that we are making progress toward bringing about a better use and management of our timber resources—this in spite of the fact that we are still cutting three saw-timber trees for every two that are growing to replace them in the forests of the nation as a whole. Significant last year was the decision of the United States Supreme Court which ruled against a private timber owner in Washington state who had appealed a law which forced him either to leave seed stock or to plant and reforest the acreage from which he took his lumber—his own land. The Supreme Court ruled in effect that he had a "pact with the unborn"—a responsibility to future generations in the way he used the land which belonged to him.[7]

This is not a squelching of private enterprise, in my opinion. It is merely common sense. It is unfortunate that it has to be done by law, but it indicates a trend in which men are beginning to realize that they have a certain stewardship of the land, a responsibility for it, not only today and in their own lifetime, but to those who come later. Twenty-six states now have some form of forest tax legislation which has partially ameliorated the impact of property taxes on forest lands, regulating cutting practices by private owners in such a way as to help to maintain a sustained yield in timber products. In New Hampshire, which enacted in 1949 a new forestry tax law, provision has been made for a premium, universally applicable, in the form of reduced taxes when cutting has been in accordance with specified forestry practices.

Still, this is a far cry from the old days fifty to seventy-five years ago, when the creed was "cut out and get out." Thousands of acres of dead stumps and burned-over land in the Lake states, in the Pacific Northwest, in New England, and in the South stand as mute testimony to this exploitive use of a highly important and basic resource, valuable not only for timber products but also in holding the water on the land where it falls, thus reducing floods and maintaining water supply.

---

[7] "Pact With the Unborn," *Outdoor America*, Vol. 15, No. 2 (Feb. 1950), p. 2.

While we may not have a "timber famine," as Gifford Pinchot predicted, we have reached a point of inadequate supply of growing trees in terms of our real needs at a reasonable price. Unfortunately, the day of recognizing a timber famine has been postponed by the stored-up abundance in our virgin west coast forests. Atom bombs severing our east-west transportation arteries would leave little doubt of a timber famine on the eastern seaboard. The debate as to whether we actually have a timber famine, which is the chief area of controversy in this field, would be settled quickly.

WILDLIFE CONSERVATION

In wildlife conservation there are many current predictions that wildlife is on the way out and that the end of public hunting and fishing in this country is near at hand. Opinions are many that much of our wildlife will have vanished soon or reached the point where it will be unimportant, at least from the sportsman's point of view. True, we have lost several important species for all practical purposes; the buffalo, the passenger pigeon, the heath hen, the condor, and the whooping crane are among them. A current case is the Florida key deer—a tiny animal weighing not more than 30 pounds, of which there are probably not more than fifty now living on isolated keys. Steps are being urged upon Congress by state and national conservation organizations to preserve this final remnant.

Few people realize the impact which the harvest of fish and game crops has on the nation's economy. Arthur H. Carhart has pointed out, in a well-substantiated article, that the total expenditure of those hunting and fishing in the United States in 1950 was in the neighborhood of $9,200,000,000! It is interesting to note that the annual hunting dog bill alone is *greater* than what the whole American public spends attending football, basketball, baseball, boxing, horse racing, and all other spectator sports combined.[8]

Our future wildlife supplies, on which this large investment is based, are again tied to a basic problem of land and water maintenance in the face of growing population pressures. It is commonly expected that unless unforeseen conditions prevent it, the population of this country will reach 200 million by the year 2000. In addition to raising problems of feeding and clothing this populace (and a sizable number of other peoples of the world), growing population pressures have had a great impact upon our wildlife resources. In 1935 a total of about 10 million hunting and fishing licenses were sold in this country. Last year 16.5 million fishing licenses and 12.5 million hunting licenses were sold. Also, we have more leisure time to go out in pursuit of fish and game than in past years. At the same time, expanding agriculture, towns, industries, transportation, and other facilities are taking habitat away from the desired and sought-after game mammals, birds, and fishes. Something obviously has to give.

That is the big problem today—how to maintain habitat for the wildlife which we like to have around us for one or another purpose, in face of increasing pressures upon them. Basically, our wildlife resources will fluctuate with the way in which we handle and manage places where they live and the food they eat; that is, the soil, the forest, the vegetative cover, and the waters. It is important to us to have programs for the management of fish and game populations and other wildlife populations; nevertheless, thoughtful conservationists recognize that these are by-products of sound land and water management in the public interest.

---

[8] Arthur H. Carhart, "Hunting and Fishing is Bigger Business," *Sports Afield,* June 1951.

Again, the chief conflict in this area of conservation is over what products shall be produced from a given land and water area, and for whose benefit. For example, shall we produce X number of birds and mammals for the hunter to harvest or the nature lover to view, or shall we use that same area to produce cash crops of corn, wheat, or potatoes? We can do, and are doing, both. The controversies arise over how much land shall be delegated to each objective, and to what extent we can achieve both.

SOIL CONSERVATION

The conservation of soil resources is a broad field with which the public is becoming increasingly concerned, and rightly so. Soil conservation is basic to conservation of all other resources, and obviously to the continued health and prosperity of the people. Since the dark days of the thirties when we suddenly woke up to find much of the soil of the Great Plains blowing away on the wind, great strides have been made in the development and the putting into practice of techniques to conserve the thin layer of topsoil which represents survival to our civilization. The Soil Conservation Service has done an admirable job of getting the man on the land to recognize his responsibilities to himself, his neighbors, and the future, though, of course, the job is by no means completed.

An organization of the landowners themselves, the National Association of Soil Conservation Districts, has come into being with the chief purpose of spreading the soil conservation gospel in the common interest. This is a grass-roots organization, legally established, locally governed by landowners. There are over 2,300 Soil Conservation Districts now in existence in the United States.

The chief point of controversy in this connection is whether drainage, certain types of reforestation, and other soil conservation practices are inimical to wildlife conservation—this in spite of the fact that basically what is good for the land is also good for wildlife. Wildlife interests have questioned the desirability or need of widespread drainage of potholes used by waterfowl in the Lake and Plains states. This controversy is gradually being resolved through co-operative efforts of the Soil Conservation Service, the Fish and Wildlife Service, and the landowner (who is still being paid in some cases, with tax money alloted the Department of Agriculture, for draining his potholes), with the interested sportsman who wants to harvest the ducks keeping a watchful eye on the whole process.

HISTORY OF THE CONSERVATION MOVEMENT

The reader will now recognize, I trust, that conservation encompasses a great deal more than saving a few songbirds or producing a few more fish or animals for the sportsman to harvest. Historically, to be sure, the nature lovers and the sportsmen, one for aesthetic reasons, the other to perpetuate his harvest, gave the movement its initial impetus. By the time Theodore Roosevelt and Gifford Pinchot came along at the turn of the century, and broadened the concept of conservation to include more than just wildlife, the people were emotionally ripe for a crusade. That is precisely what occurred. Wildlife was the first resource product of the land and water to receive attention, because our early economy was hitched closely to it for a continuing supply of food, clothing, and other necessities. Next to receive attention were our forests (the Pinchot crusade), and for thirty years the term "conservation" meant forest conservation to most people. In that era we established the National Forest system for timber and watershed management and protection, and the National Park system for the protection of wildlife, native flora, and scenic resources.

Next, stimulated by the specter of middle America blowing away in the dust bowl calamity of the early thirties, soil conservation became popular. The wildlife enthusiasts remained active and grew in organization and strength the while.

The technicians began to understand and to get across to the people the concept that all these resources were interdependent and that what we did with one affected another for better or for worse. A few technicians, administrators, and laymen developed what the late Aldo Leopold referred to as "an ecological conscience,"[9] and began to preach it to all who would listen. The understanding of man's relationship to man and to his environment developed into a full-fledged science called "ecology."

During the growth of the movement several lay organizations came into being, most of them to champion a particular aspect or resource in the conservation movement. These followed the professional societies, most of which already existed in the fields of forestry, fisheries, wildlife, mammals, birds, botany, ecology, soil, and others. Added together, their policies and programs pretty effectively encompass most aspects of resource conservation, and collectively they represent the organized public voice and public interest in our country's resources. The lay organizations (not the professional) are pressure groups, to be sure, but almost without exception they are pressuring in the public interest, rather than for any special group.

NATURAL RESOURCES COUNCIL FORMED

In 1948 these lay conservation organizations joined with the technical societies in establishing the Natural Resources Council of America to serve some thirty-five member organizations. This council, a service organization, proposed a public Policy for Renewable Natural Resources at the time of the Seventeenth North American Wildlife Conference on March 18, 1952 in Miami, Florida.

This statement can be considered a fair reflection of fundamental agreement by the member organizations on principles for the management of our renewable resources for the long-range economic and social welfare of the nation, and, as such, is being urged by the member organizations for adoption by Congress. It represents a definite milestone in the conservation movement in that it indicates a union of technicians and laymen in a common cause—a major achievement fundamentally necessary to such successes as the movement may ultimately enjoy.

The growth of the conservation idea will continue to take myriad forms, and controversies will rage over everything from using herbicides for clearing highway rights of way to how many sheep should be permitted to graze on a national forest. They must ultimately be resolved. Whether they are resolved for the public good over the long pull will in part depend upon how successfully the conservation forces can defend their stated principles and beliefs.

Inherent in this is the necessity for education—not only of future generations, but of the present. Needed is financial and other support to bring the public to a realization of conservation essentials before this society and civilization disintegrate, as have others in the past when they suddenly found the cupboard was bare. With many resources, the bottom of the barrel seems a long way off. With others, it is clearly just around the corner. Responsible industry has already awakened to the problem and is lending its support. More of the same on the part of professional and lay leaders in all walks of life—doctor, lawyer, preacher, merchant, housewife, union chief, professional politician, journalist—is necessary.

---

[9] Aldo Leopold, "The Land Ethic," in *Sand County Almanac* (New York: Oxford University Press, 1949), p 207.

It is still too fashionable to deride the thoughtful student of population problems and resource wastage who may be inclined to overstress the adverse, but who, nonetheless, has pointed out that there *is* a limit to how much the land can produce in foods and fibers and that the day can come when there will be a smaller cut of the pie for each to have. How soon it may happen at the present rate of demand, I would not venture to guess. That it *can* happen here seems true. It strikes me as only common sense to take the conservation view and seek to guarantee, as far as humanly possible, that it will not do so.

Robert O. Beatty, Chicago, Illinois, is conservation director of the Izaak Walton League of America, Inc ; editor of Outdoor America; and secretary-treasurer of the Izaak Walton League of America Endowment, Inc.; and has been a free-lance writer for outdoor magazines for the past five years. He has done timber stand improvement work for the United States Forest Service, and has been a research assistant to the Institute for Fisheries Research, Michigan Department of Conservation, and to the Fish Division of the University of Michigan Museum of Zoology.

The Citizen's Part in Conservation

By John H. Baker

AMERICANS are tremendously interested in conservation. State legislators have said that they receive more mail about conservation legislation than about all other subjects combined. Laws have been put on the statute books as a result of citizen participation in conservation planning. The result is a more advanced body of conservation legislation in America than anywhere else in the world.

The greatest progress made in conservation in our generation has been growing recognition of its basic relation to human welfare—the broadening of horizons and the scope of operations and goals of the organizations working in the conservation vineyard. No longer, as a rule, can we afford to compartmentalize our thinking or action. We cannot expect thus to win, as a people, in the battle of life on this planet. No longer can we attain our ends by organizing for special purposes that represent a preferential interest conflicting with other preferential interests in the same general field.

The National Audubon Society, for example, endeavors to make people aware of the steady stream of life around them; of its beauty, richness, and complexity; and, above all, aware that they are part of this exciting pageant of events; that human life is affected in all sorts of ways by every plant that forms a seed, by every prairie dog that makes a burrow, by every dragonfly that emerges from its nymphal case; that man is, in fact, part and parcel of the biological picture, and can no more escape therefrom than from birth or death.

It is encouraging that we are getting down to fundamentals. Soil and water conservation is basic if our over-all resource picture is to improve. For too long, soil and water were orphans of the storm, and the situation is far from remedied yet. Ecology, though still dimly understood by the average layman, is slowly gaining public recognition and acceptance. The cries of "shoot the predators" and "build more game farms" are heard less often. It is finally becoming understood that game will not prosper unless it has suitable habitat, but will then prosper without any predator control other than that of man. Enlightened groups are now working to improve wildlife habitat in every possible way; they work with Soil Conservation Districts and other agencies to prevent soil erosion and abuse, because they know that wildlife needs healthy land as much as people do.

Variety of Goals

Most persons interested in natural resource conservation participate in the programs of the thousands of voluntary organizations, on national, regional, state, county, and local levels, that have been established to advance conservation objectives. Some have goals that are diametrically opposed to those of other groups that also regard themselves as conservation agencies. This is merely a reflection of the many differences of opinion about conservation matters. The disparity in viewpoint between, let us say, the Baptist preacher who espouses fundamentalism and the Unitarian minister's "realistic" approach is no greater than is to be found in the conservation field. Despite their varying philosophies, often brought into sharp focus at legislative hearings, our conservation organizations do team up with reasonable effectiveness.

A listing of some of the national conservation organizations will give an idea of the variety of purposes they serve: American Forestry Association, Washington, D. C.; Conservation Foundation, New York City; Friends of the Land, Columbus, Ohio; Izaak Walton League of America, Chicago, Illinois; National Audubon Society, New York City; National Parks Association, Washington, D. C.; National Wildlife Federation, Washington, D. C.; Wilderness Society, Washington, D. C.; Wildlife Management Institute, Washington, D. C.

There are a number of others, many with specialized interests, such as the Sierra Club, the Wild Flower Preservation Society, Ducks Unlimited, Sport Fishing Institute, and the conservation committees of the Garden Club of America and the National Council of State Garden Clubs, Inc.

KEEPING INFORMED

Each national conservation organization concentrates on certain major objectives, though its scope of interest and influence may cover the entire conservation front. This is as it should be. Most executives of national conservation organizations make it their business to keep in close touch with key personnel of the governmental agencies charged with conservation work. Therefore the views of the organizations are usually well known to the departments and bureaus concerned. Much the same is true of Congress. Those legislators who are particularly concerned with conservation problems are kept informed as to the thinking of the conservation groups. Congressional committees frequently hold public hearings on controversial matters, and these are well attended by organizational representatives.

Somewhat the same situation exists on state and local levels. Most governors or state conservation departments have advisory committees that keep them abreast of grass-roots opinion. It is unfortunate that some of these committees are representative of special rather than public interest in the field. In some cases they reflect solely the point of view of those whose main objective is harvesting more game now, not later.

Occasionally someone suggests that perhaps greater effectiveness could be achieved by co-ordinating or merging the major national conservation groups into one superorganization. This is advocated on the ground of "efficiency." With human nature operating freely in a democracy, the chances that such a plan would produce desirable results are practically nil. There would be great dissension over emphasis, both in policy and in application of funds. A single agency probably could not command the financial support that is given to the combination of present voluntary organizations. At present there is a good spirit of give-and-take among the various groups. Any two of them may be in complete disagreement one month and work hand in hand on another issue the next month.

PERSONAL PARTICIPATION

It has been estimated that some ten million Americans pay dues to conservation organizations. It is through membership in, and financial support of, the national conservation organizations and their local branches, chapters, or affiliates that John Q. Public has the best opportunity to further conservation. In the local groups he can have the satisfaction of personal participation in specific projects, and pride in personal accomplishment.

The individual may find himself on a committee of his local organization to survey the need of conservation in his community and its environs. If so, he is likely to sustain a series of shocks. He may discover that most of the timber products used in his area were not grown there, nor in his state, nor even in his nation. He may find deep scars on the land and observe that only a fraction of the farmers are using soil conservation methods. If he wonders at the paucity of wildlife, his questions will be answered by the drained marshes and barren fence rows that are symbols of modern farming. In our rush to put every acre to use in producing even greater farm surpluses, we have made it hard going for wildlife. The old wooden and stone fences supported vines and shrubs that offered abundant food and cover. The potholes bred ducks, muskrats, and a variety of other wildlife. The modern farm may produce a few bushels more of potatoes or corn, but one can hardly believe that it is a better place to live than the farm of yesteryear.

BRANDYWINE VALLEY ASSOCIATION

Because state lines are, after all, artificial political boundaries, some organizations are regional in nature. With the development of what is called the "watershed approach" to conservation planning, it seems logical that regional organizations will increase. A good example is the Brandywine Valley Association.

Some years ago a group of civic-minded men and women took a long, hard look at the 330-square-mile area where they lived. They decided that the Brandywine Valley in Pennsylvania and Delaware, where reside some 200,000 people, was not receiving the sort of treatment that befits a good home. Because they had the common sense to realize that their health and prosperity depended to a considerable extent on the natural resources of their region, they formed the Brandywine Valley Association. According to their own statement, it was organized to provide a common meeting ground on which ideas and information could be exchanged and progress measured. The association's program encourages and aids the people of the Bandywine Valley to reduce soil erosion and silting, lessen flooding and drought damage, decrease stream pollution, improve and protect existing woodland, reforest marginal lands, and preserve wildlife and natural beauty.

The work of the Brandywine Valley Association is largely educational, as is that of most conservation organizations. Members of its full-time staff attend meetings and demonstrations throughout the valley and succeed in arousing interest in conservation problems that are so close at hand that few people see them.

It did not take the association long to discover that no matter how valuable improved procedures are, they have to be sold to the landowners or industries involved; so it is helping to acquaint the residents of the valley with the ways in which they can utilize the services of conservation agencies. The organization has steered clear of partisan affiliations of any kind. It has enlisted as backers many of the most influential citizens of the Brandywine Valley. Certainly no one can deny that the valley is a better place today because of active citizen participation in conservation planning.

REACHING THE CHILDREN

Whenever conservationists meet at conventions, lamentations are heard on all sides about the failure of our school ystems to teach conservation effecvely. It is alleged that most of our roblems today result from this shortoming, and that the conservation fuure will not be very rosy unless remedial action is taken. Back in 1911 he National Audubon Society decided o do something about this matter. Ilustrated material for children and proram aids for their teachers were made vailable, and over nine million Amerian and Canadian children will have enolled as members of Audubon Junior Clubs by April 1952. The great maority of these are alive today, and it is easonable to deduce that their comined thinking has had, and is having, measurable beneficial effect on governmental policies and legislation.

In 1936 the society launched its summer camp program for adults, especially esigned to be of practical aid to school personnel, youth leaders and camp ounselors, recreation and playground personnel, conservation chairmen of soieties and clubs, and others with a hobby or professional interest in nature. These camps are more than natural history schools. They are concerned with more than simply stimulating hobbies or professions. They aim to develop majority public opinion favorng intelligent treatment and wise use of our natural resources, so that there may be constructive legislative results, with popular enforcement.

The society is working on the leverage principle, imparting a knowledge of uccessful teaching techniques to teachrs and other youth leaders, each of whom may be expected to reach an avrage of thirty youngsters during the nsuing year. Some six hundred perons graduate each year from the three camps now operating in Maine, Connecticut, and California. Picture, then, he influence to be attained by a dozen uch camps geographically distributed hroughout the continent, graduating annually some three thousand youth leaders possessing opportunity to reach, each school, troop, or club year, some ninety thousand young people. Bear in mind that the camps cater to new students each summer, so the effect tends to snowball rapidly.

If, in a two-week session, the society conveys to each student comprehension of the interrelationships of soil, water, plants, and animals and an awareness of their impact on human welfare; imparts to them knowledge of successful teaching and leadership techniques, not by listening, watching, or reading about them, but by trying them out in the field under guidance; develops in them a wonderful spirit and the feeling that they have never had a better time in their lives; causes them to wonder how we can give them so much for so little and send them home with new zest in life and a will to further conservation in their own communities—if these things are accomplished, we have gained our principal objectives.

Upon returning to Minneapolis from the Audubon Camp of Connecticut, several school teachers decided that direct action was advisable. With official blessing, they formed a conservation committee in the Minneapolis public schools. Teachers from different grade levels, principals, and supervisors are on the committee. They meet regularly to discuss ways of integrating conservation into the curriculum and to exchange their own experiences and ideas. It augurs well for the future.

PROGRESS DESPITE LIMITATIONS

It is not possible to cover with thoroughness in this article all the ways in which citizens, through the organizations they have formed, take part in conservation activities. Nevertheless, public opinion continues to lag many years behind the findings of science in conservation work. It has been said with some truth that our greatest problem now is not so much to conduct more research to find more facts, as to do the educational job necessary to acquaint the public with the known facts, so that the policies of governmental conservation agencies may be up to date.

Virtually every conservation organization is carrying on work that is made possible by the interest and support of individual citizens banded together to accomplish certain purposes. Only a handful of these groups are endowed, and those inadequately. The others are operating on shoestrings. The few organizations in the conservation field that are sometimes inaccurately described as "wealthy" have tiny endowments when compared with even small-sized colleges or museums. The largest present endowment of a conservation organization is less than three million dollars.

Despite the limitations under which conservation organizations work, a tremendous amount of progress has been made. Conservation has evolved from a philosophy propounded by people who were regarded as cranks into an accepted doctrine that now finds wide public support. No realist can afford to do much boasting about what has been accomplished, because so much remains to be done. We can all rejoice, however, in the fact that large numbers of citizens are now participating in conservation work. We shall doubtless see the day when conservation will be the way of life in America.

John H. Baker, New York City, is president of the National Audubon Society, and is chairman of the Committee on Conservation advisory to the Secretary of the Interior. He has been a breeder of Aberdeen-Angus beef cattle on a farm in Dutchess County, New York, since 1930. He is editor of Audubon Guide to Attracting Birds (1941).

Our Future Dependence on Foreign Minerals

By Alan M. Bateman

A GLANCE at the history of the development of leading industrial nations reveals that their rise has coincided with the utilization of their mineral resources, notably coal and iron ore. Those countries abundantly supplied with diversified mineral resources became the great industrial nations, and the politically and militarily strong ones. It is no accident that large industrial centers sprang up in central England, in the Ruhr, in France, and in the United States around the Great Lakes, in Pennsylvania, and in Alabama. For there, coal and iron ore met, and the fusion of the energy of fuels and the solidity of metals spelled industrial growth that developed into industrial might. Today, similar developments are taking place in Russia. Those who hold the purse strings of mineral resources hold power.

It is startling to realize that the rise of the industrial age has so accelerated the demand for minerals that we have dug and consumed more mineral resources within the period embraced by the two world wars than in all preceding history. This insatiable demand for minerals to feed the hungry maw of industry and armament has made sources of supply that we used to think were adequate, now look relatively small, and sources of large supply are becoming fewer and fewer.

Our domestic mineral reserves have suffered deep inroads in the building of our economy, and the war demand made still further inroads. Our former bountiful mineral supplies of which we were justly proud now show serious depletion. Every automobile, building, machine, ship, train, tank, or plane requires its quota of many kinds of minerals, and of course armament is absolutely dependent upon them. Without a steady flow of minerals our industrial life and our national security would be jeopardized. Consequently, the distribution and ownership of mineral resources become of prime importance.

Despite intensive mineral exploration in this country, and expanded aggressive research in metal recovery, the use of substitutes, and other conservation measures, it is inevitable that the United States will more and more have to depend upon foreign sources of minerals. This demand will increase not only because of normal depletion of our ore reserves, but also because our increasing population will continue to demand houses, rapid transportation, and more labor-saving devices in the home, on the farm, and in the factory—and all of these require metals and minerals in large quantities. Should the bells of war toll again, the mineral situation would become even more acute. Thus, the United States must look more and more to increasing quantities of minerals from foreign sources. It means that we shall be forced into the British pattern of importing minerals in order to fabricate materials for export, to pay for mineral imports. This requires a different foreign policy.

But let us turn now from generalities to the lessons taught by World War II.

WARTIME MINERAL SITUATION

World War II brought a rude shock. We found that our smugly assumed domestic mineral abundances turned out to be woefully inadequate to meet wartime requirements. The dozen strategic minerals of prewar time jumped to five dozen, because quantities of nearly every mineral used in industry had to be imported. During World War II we had to turn to fifty-three countries for imports of some sixty different minerals, of which twenty-seven came exclusively from foreign sources. We had to import six million tons of copper, lead, and zinc alone, three metals of which we had thought we had enough, and manganese at the rate of 1½ million tons a year. We get another shock when we glance at a few figures for twenty of the most vital minerals that form the basis of wartime and peacetime industry. Of these, we were 100 per cent dependent upon foreign sources for eight of them; 85 to 100 per cent dependent for six of them; 37 per cent dependent for copper and zinc, and 44 per cent for lead. It is startling to realize that in the postwar years the demand for most of these same twenty minerals for peacetime and defense developments is just as great as, or greater than, during actual war conditions, and it will be much greater in another twenty-five years.

Another interesting study was made by experts of the United States Geological Survey and the United States Bureau of Mines and published in 1948 as the *Mineral Resources of the United States*.[1] This revealing document portrays the ratio of production to consumption in 39 minerals during the periods 1935–39 and 1940–44. Before the war, production equaled or exceeded consumption in 11 out of 39 minerals, but several of these are common and not vital minerals. But for the more critical minerals, in 12 out of the total of 39, domestic production yielded only 50 to 100 per cent of our needs; for 6 it ranged from 10 to 50 per cent; and for the last 10, from 0 to 10 per cent.

The present and probable future rate of domestic consumption of minerals is vastly greater than in the 1935–39 period. Then, steel production, as a gauge of industry, ranged from 28 to 50 million tons annually; today it exceeds 102 million tons. Since then there has been a population increase of about 15 million people; there are more homes, higher wages, and labor shortages, and these spell demand for mineral-consuming labor-saving and luxury articles. The home, the farm, and the factory have become more mechanized. All of this means an increase in the future demand for metals and minerals vastly greater than the consumption of 1935–39.

It is timely now to glance at the present situation as to our well-being in available domestic supplies of these materials so basic to industry and defense.

Present Mineral Situation

Even more revealing, however, is another set of figures prepared by the same experts that give the reserves of 41 minerals expressed as years of life based on the 1935–44 rate of domestic consumption (reserves divided by average consumption). This brings out startlingly that, although there is a life of half a century or more for 15 of these 41 minerals, 3 of them would last only 33 to 39 years, and the remaining 26 have an indicated life of less than 25 years. Of the latter, 9 have a life of less than 10 years, and for 8 there are no reserves. These are telling estimates, and it is important to note that the long-life minerals include many substances of minor critical importance, such as helium, or substances of unrestricted sources of supply, such as salt and magnesium. The real backbone minerals such as copper, lead, and zinc are all too short—19, 10, and 20 years of life respectively. And these figures were prepared as of 1944!

---

[1] Public Affairs Press, Washington, D. C., 1948.

Even though these estimates of reserves were too low, and in my opinion they are, they would still indicate near-future domestic shortages even if they were increased by 50 to 100 per cent. I think these figures of reserves will be extended through increased technology, the development of more scientific methods of mineral exploration, and conservation measures.

This picture of United States mineral resources is the result of the long-continued heavy drain upon them in the building and defending of a great industrial nation. In addition, we are pouring out vast quantities of goods manufactured from minerals to supply foreign aid, such as machines, railroad, mining, and agricultural equipment, and goods for electricity, power, transportation, and factories. The irony is that the more we build our industrial and military power, along with that of other countries, the faster we exhaust the very basis of this power. And, unfortunately, most of the goods we ship abroad carry out raw materials that do not return to us.

THE OUTLOOK

We have to face clearly the fact that under increasing mineral developments we are approaching a crisis in our mineral situation. Despite intensive domestic mineral exploration, technology betterments, substitutions, and the wiser use of scarce metals and minerals, the United States will have to become more internationally minded with respect to minerals and more cognizant of foreign mineral potentialities. Indeed, its foreign policy should be oriented to help eliminate existing trade barriers and stimulate the flow of minerals to this country.

A critical period is the next twenty-five years during which our increase in consumption over production of minerals will be steadily mounting and our domestic production of many minerals will be rapidly waning. The expected divergence of consumption over domestic production unquestionably will stimulate further conservation measures and the development of substitutes that will tend to lessen the normal divergence. Table 1 gives, for twenty-six critical minerals, the actual dependence upon foreign sources for the three full years of World War II and an estimate of the dependence upon foreign sources in 1975.

Table 1 does not include several mineral commodities of which indicated United States resources are more than sufficient to supply United States needs over the next quarter-century. Those include magnesium from sea water, nitrates obtained largely from the air, and natural gas, helium, coal, salt, phosphate, potash, and molybdenum. Neither does the table include several minor metals such as arsenic, bismuth, and cadmium, or platinum and uranium, each of which must largely be supplied for United States consumption from foreign sources. Altogether, of 71 mineral substances currently on the national stockpile purchase list, only 8 are produced in any large quantity in the United States; and the Defense Production Administration lists in critically short supply some 44 metals, 9 chemical minerals, and 18 nonmetallic minerals.

The figures in Table 1 of the percentage of dependence upon foreign ores in 1975 are of necessity estimates. These estimates take into consideration the probable consumption demand by 1975, the estimated domestic produc-

TABLE 1—DEPENDENCE ON FOREIGN MINERALS (PER CENT) IN WORLD WAR II AND IN 1975

Mineral	Per cent foreign during World War II	Per cent foreign in 1975	Probable chief foreign sources
Antimony	83.2	94	China, Mexico, Bolivia, Peru
Bauxite (aluminum)	18.18	85	Surinam, British Guiana, Jamaica, Indonesia
Beryl	90.6	90	Brazil, India, Argentina, Africa
Asbestos (strategic)	100.0	100	Rhodesia, S. Africa
Chrome	89.6[a]	100	S. Africa, S. Rhodesia, Turkey, New Caledonia, Philippines, Cuba
Cobalt	85.6	90	Belgian Congo, Rhodesia, Canada
Corundum	100.0	100	S. Africa
Copper	37.6	65	Chile, N. Rhodesia, Belgian Congo, Canada
Diamonds (industrial)	100.0	100	Congo, Angola, S. Africa, Brazil
Fluorspar	2.0	50	Mexico, Africa
Graphite	100.0	100	Madagascar, Ceylon
Iron ore	2.0	35–45	Venezuela, Canada
Lead	44.2	70	Mexico, Peru, Australia, Canada
Manganese	85.5[a]	80	India, Africa, Brazil, Cuba
Mercury	43.2	80	Italy, Spain, Mexico, Canada
Mica (strategic)	88.0[a]	95	India, Brazil
Quartz (radio)	99.0	100	Brazil
Nickel	100.0	100	Canada, Cuba, New Caledonia, Celebes
Petroleum	0.0	50	Venezuela, Middle East, Canada
Tantalum-columbium	99.0	99	Brazil, Congo, Nigeria
Sulphur	0.0	50	Canada, Mexico, Europe
Tin	100.0	100	Malaya, Indonesia, Bolivia, Congo
Titanium	26.0	80	Canada, India, Norway
Vanadium	32.4	25	Peru
Tungsten	61.1	70	China, Bolivia, Brazil, Portugal
Zinc	36.7	60	Mexico, Peru, Australia, Canada

[a] The remainder, from domestic sources, was mostly unusable; therefore these figures in reality should be higher.

tion, and probable substitutions and replacements. Some of these may now be considered in a little more detail.

THE STEEL-MAKING MATERIALS

The making of steel requires primarily coal and iron ore, but also several other mineral constituents, chief among which are manganese, fluorspar, and graphite. In addition, there are a number of alloying constituents absolutely essential to the making of the special steels required today for the manufacture of machines, equipment, and armament. Chief among these are chrome, manganese, nickel, cobalt, tungsten, molybdenum, and vanadium.

Of these steel-making constituents, coal, of course, is in abundance; but United States sources of high-grade iron ores are now beginning to run short. Already we are turning to imports of iron ore from Venezuela, Canada, and Chile, and in another twenty-five years the United States will have to lean quite heavily on Venezuela, Canada, and perhaps Brazil for high-grade ore.

Fully alive to the situation, United States steel interests are initiating the mining and milling of the low-grade taconite ores—at a capital cost of 200 million dollars for each 5 million tons of production. Every ton of steel produced requires some 12 to 14 pounds of manganese to make sound metal. Our production today is a small fraction of the total required, but there is hope that processes presently under investigation may in the future recover some of the manganese now wasted in steelmaking slags. The production of fluorspar required for the purification of steel has dropped from an excess over consumption during World War II to an estimated 62 per cent of consumption in 1951;[2] and graphite for steelmaking crucibles must still come largely from far-off Madagascar and Ceylon. Of the alloying metals mentioned, the United States is sufficient only in molybdenum and partly so in vanadium, and the existing shortages of today will grow much larger in another twenty-five years when demand may increase from 30 to 50 per cent over the present. It is true, of course, that new alloying substitutes such as boron will displace the need for some of the deficient alloying metals.

THE INDUSTRIAL (NONFERROUS) METALS

One of the most striking reversals in United States domestic supplies is that of copper, lead, and zinc, three basic metals which we hardly dreamed could ever be in short supply. Today around a third of our needs must come from foreign sources, and in another twenty-five years our imports are expected to jump to between two-thirds and three-quarters of our domestic requirements, taking into account that considerable aluminum will be substituted for copper, and plastics for lead.

The use of aluminum is expected to grow by leaps and bounds, with attendant shrinkage of domestic bauxite supplies and greater leaning on foreign high-grade bauxite. As long as high-grade bauxite is available, it will be the preferred source of aluminum ore; but the industry can change over, at a cost, to the use of lower-grade clays and aluminous rocks as a source of the metal.

Tin is almost nonexistent in the United States, and none may be expected. The chief sources of free-world tin lie in areas of political unrest and uncertain future security. Consequently, United States consumers of tin have been bending every effort to make themselves independent of imported tin as far as possible. The wise use of tin and the development of electroplating with thin coatings, and of substitutes, is so reducing the needs for tin that it is even possible the demands twenty-five years hence may not appreciably exceed those of today.

Titanium, the metal of the future, will make up in part for some of the expected deficiencies in other metals. United States reserves will diminish sharply over the next twenty-five years, and the titanium center of the world will shift to Quebec, where reserves are sufficient to supply the entire world demand.

MINOR METALS

Among the critical minor metals are antimony, mercury, tantalum-columbium, silver, and platinum metals, each of which is presently deficient in the United States, and the shortage will be intensified in the future. The United States will always be dependent upon foreign sources for supplies of these minerals, although domestic production partially meets the needs for mercury, silver, and antimony. Silver, whose industrial and military photographic uses have been climbing steadily, falls far short of meeting current domestic demands, and the outlook for the future is for a much greater deficiency, to be made up largely from Mexico and

---

[2] U. S Bureau of Mines.

Canada. Substitutes will be needed to meet world demands. Tantalum-columbium are relatively new metals in the industrial demand. Columbium is intensely sought at present for heat-resisting alloys for jet plane use; but the present United States demand so far exceeds total world supply that new, less effective, alloys must be developed for replacement.

NONMETALLIC MINERALS

Of the critical industrial nonmetallic minerals shown in Table 1, strategic asbestos, beryl, corundum, industrial diamonds, strategic mica, and radio quartz are largely nonexistent in the United States, and foreign sources will have to be depended upon for 90 to 100 per cent of future supplies. Sulphur has been an excess mineral of which the United States has supplied most of the world demand; but no such pleasant condition can hold twenty-five years hence. By then, the brimstone sulphur of the prolific Gulf Coast salt domes will have been largely exhausted, and the United States will have to develop economical processes for the extraction of sulphur from sulphur-bearing minerals, or rely on imported sulphur.

The nonmetallic group of critical minerals offers the best opportunity for the development of substitutes and replacements. Owing to the development of synthetic quartz crystals and synthetic and built-up mica, we are no longer wholly dependent upon foreign sources for all uses of these strategic materials. Likewise, corundum and asbestos offer opportunity of being in part replaced by other, less effective substitutes.

FREE-WORLD SOURCES FOR FUTURE NEEDS

A brief study of the last column of Table 1 reveals that the chief foreign sources that might meet the future mineral needs of the United States are chiefly Latin America and the dominions and colonies of the western European nations. More particularly, the British Commonwealth countries contain in abundance those minerals for which the United States will find itself dependent upon foreign sources. The United States and the Commonwealth together own or control about three-quarters of the free-world mineral resources. Moreover, the dominions and colonies of the Commonwealth include vast, slightly prospected, hinterland areas underlain by rocks geologically favorable for the discovery of extensive additional mineral resources to supply future world needs.

It is noteworthy that of 32 chief critical minerals the British Commonwealth has a surplus of 24, is deficient in 7, and lacks only 1. Of the same minerals the United States is deficient in 18 and has a surplus of 9. Rather strikingly, of the 18 minerals in which the United States is deficient, 13 are abundant in the Commonwealth; and all 5 that we lack are in excess in the Commonwealth. Conversely, several of the Commonwealth deficiencies are surplus in the United States. Thus, each complements the other in mineral supplies. If each desires to maintain its political security and peacetime industrial development, it follows that they must ever be closely associated in foreign policy, international trade, and naval strength to protect supplying sea lanes. If the Commonwealth were to fall, it would be almost as disastrous for us as for them.

The European North Atlantic Treaty countries by themselves are woefully deficient in most of the essential minerals of industry. However, the countries of the British Commonwealth and the overseas empires of France, Belgium, Portugal, and the Netherlands together with the United States as a group are completely self-sufficient for all their mineral needs for the future. What one lacks, the others have. Unfortunately, however, their mineral resources are widely scattered on all the continents, and ocean voyages of thousands of miles are required to transport the needed materials to the centers of consumption. This means millions of tons of shipping that has to be protected in the event of emergency. This, in turn, spells large navies and air forces. Remove this mineral traffic, and industry largely ceases.

The United States could not support herself industrially in the future as an isolationist country, even if she had free access to all the minerals of the Western Hemisphere; for she would still lack some thirteen important industrial minerals which are supplied to her by the North Atlantic Treaty countries. Thus, there are basic mineral reasons, as well as political ones, why our security and industrial future must be closely tied in with those of Europe and our navies and air forces must jointly control the seas. If Europe should be overrun by an unfriendly power that could control the destinies and resources of the European dominions and colonies, our industrial life would wither and our national security be placed in jeopardy. Our military aid to Europe therefore is not, as many infer, a purely one-sided affair; it safeguards our future industrial development and security.

RUSSIA'S MINERAL SITUATION

In contrast to the United States, Russia is now practically self-contained in the minerals of industry. Her deficiencies of World War II have now been largely made up by the inflow of minerals from the Iron Curtain countries. Lead and zinc flow from Poland, East Germany, and the Balkans; chrome, molybdenum, and antimony from the Balkans; uranium from Czechoslovakia and East Germany; nickel from former Finland; tungsten, antimony, tin, lead, zinc, graphite, copper, and others from Manchuria and China. This inward diversion of minerals, not to return, not only has removed supplies that formerly fed western Europe, but largely makes up Russia's own deficiencies. These minerals, together with Russia's own great resources in the critical industrial minerals, make her entirely independent of sea-borne mineral supplies. In this, Russia stands alone among all industrialized nations. Moreover, the few minerals that Russia does lack are those that move in such small quantities that they can be transported by airplane or submarine.

Russia's actual and potential minerals, which she herself controls, combined with her large population rapidly becoming industrially minded, make her potentially a colossal industrial giant of the future, and perhaps the leader of the world.

OUR FUTURE COURSE

The United States' growing dependence upon foreign mineral supplies, which will be greatly accentuated in the future, forcibly brings home the necessity of the following steps, mostly conservation:

1. Intensive research into all methods of conservation of mineral resources.
2. A wiser use of scarce minerals.
3. Prevention or elimination of loss or waste of minerals during mining.
4. Improvement in mining methods and mineral processing.
5. Better and more extensive use of recovery of metals from scrap.
6. Extensive research into the development of substitutes and replacements for scarce metals and minerals.
7. The further development of inhibitors and protectors to help save metals from corrosion.

8. Revision of rigid military specifications to diminish the use of scarce mineral products for purposes for which their properties are not essential.

9. Revision of domestic mining laws to permit geophysical and geochemical exploration over large areas.

10. Inauguration of a system of domestic taxation, both state and federal, to serve as incentive for mineral exploration, both at home and abroad.

11. Pursuit of a long-range program for the development and utilization of domestic marginal mineral deposits.

12. Adoption of measures to ensure an adequate flow of foreign minerals to the United States.

13. More extensive investigations of foreign mineral resources and potentialities.

14. The building up of an adequate stockpile of strategic and critical minerals for military and essential civilian needs.

Alan M. Bateman, Ph.D., New Haven, Connecticut, is chairman of the Department of Geology at Yale University. Professional investigations have taken him to most mineral-bearing countries of the world. He was Director of Metals and Minerals of the Foreign Economic Administration during World War II, and has served on numerous government agencies and missions. He is editor of Economic Geology and author of Economic Mineral Deposits (1942, 1950), The Formation of Mineral Deposits (1951), and seventy-five papers on mineral deposits.

What Is Involved in Metals Conservation Today?

By Howard A. Meyerhoff

THE concept of conservation was founded upon moral issues, and textbooks on the subject have never wholly freed themselves from this approach. The fact of the matter is, conservation must always be defined in realistic terms, and in answer to the question, "conservation for what?"

Various Views of Conservation

In the case of natural resources, there can be but one answer for Americans. Since the beginning of World War I we have used more of our nonrenewable resources—notably the solid and liquid fuels, the metals, and industrial or nonmetallic minerals—than in all our previous history. They have been the foundation of an industrial civilization envied but unrivaled either in history or in geography. The maintenance of this civilization does not seem to trouble the average citizen, whose experiences with shortages are associated with the extraordinary military demands of World War II, and whose ignorance leads him blissfully to assume that American ingenuity can meet any demand for finished products, except in the dire straits of an all-out war. He lumps the raw materials in the same category as labor, transportation, capital, and management—all of them secondary to the problem of having sufficient income to purchase what he wants.

The problems of conservation are thus pushed back upon the manufacturer, who tends to define the term as the assurance of an uninterrupted flow of raw materials adequate to support the consumer, who is the American public, in the style to which he has become accustomed.

Government agencies like the Bureau of Mines, the United States Geological Survey, and the Department of Agriculture, created to assure discovery, development, and production of raw materials, have, of course, refined this practical objective of industry. To them, conservation involves the efficient production and use, with a minimum of waste, of the raw materials necessary to maintain the American way of life, which is essentially the American standard of living.

The academician has distilled and idealized the concept of conservation still further. He is struggling to abandon the notion of conserving natural resources for posterity, though he clings to it—wisely, to be sure—in the case of recreational, wildlife, forest, and water resources. But in the case of raw materials he has been forced to the realization that he has not the faintest idea how technology may transform the wants of man within the next generation, and, like Roger Adams in his retiring presidential address before the American Association for the Advancement of Science,[1] he is inclined to anticipate a "synthetic future" for the human race. Under these circumstances he tends to define conservation in somewhat the same terms as the government conservationist, but more circumspectly in terms of the past and the foreseeable future. To him, not only should minerals be produced and used without waste, but production and use should be correlated with known and estimated reserves. However, he likewise has the maintenance of the American way of life and the American standard of living as his measure, though he is inclined to extend American standards to the other nations of the world.

---

[1] *Science*, Feb. 15, 1952.

On the domestic scene, academicians and government agencies have essentially a common purpose, which may be stated, with some oversimplification, as the efficient development and full utilization of domestic raw materials with due consideration of the relation between the rate of production and total known reserves. On the international scene, academicians have more in common with the users or manufacturers, though the latter are motivated to a greater degree by economics than by the concept of conservation.

Since the late thirties some government agencies have developed a growing appreciation of foreign supplies of raw materials, and this concern was first expressed in protest against the monopolistic grip of British-Dutch interests upon the production, distribution, and price of native rubber from southeast Asia. The action of the tin cartel aroused comparable resentment; but it took the impending and actual shortages of World War II to implement programs of foreign exploration and development in which United States government experts officially participated. Foreign activity has continued, but at a greatly reduced tempo; and much of it is now on diplomatic levels in connection with Economic Cooperation Administration and Point Four programs. Industry, on the other hand, has broadened its international horizons and has intensified its exploratory and exploitative projects in those parts of the world that are still open to western enterprise.

Domestic use of industrial raw materials must now be viewed as an international operation. It has not been easy for conservationists to shift their sights from the limited confines of the United States, its territories, and its possessions, to encompass the entire world outside the communist countries. But now that large proportions of our raw materials are coming from lands outside our political control, conservation must be considered as an international problem, and in no field is this viewpoint more essential than in the conservation of metals.

THE COMPLACENT ATTITUDE

There is no need to go beyond the years of depression in the thirties to encounter in American thinking the complacent attitude of self-sufficiency in regard to essential metallic minerals. It was recognized that domestic supplies of a few of the metals were inadequate to meet the industrial demand, but these deficiences were not considered a serious problem. Manganese and tin were the two most troublesome minerals, for manganese is indispensable in the steel industry, and glassware and other types of food containers have never been satisfactory substitutes for tin-coated cans.

Likewise, the evolution of ferrous metallurgy created increasing demands for alloying metals, of which the United States possessed only one in ample and commercial quantities—namely, molybdenum. However, the tonnages required for the manufacture of commercial steel were not large, and in a world where exploration, exploitation, and commerce were unrestricted, problems of supply were readily solved.

In such a world the villains were not the Communists, who were ready and willing to supply manganese for use in American steel mills. Rather, they were the British and the Dutch, who made the most of natural monopolies to restrain trade and raise prices in tin and diamonds, not to mention rubber and quinine.

American industry found it expedient to keep a watchful eye and, where possible, a controlling interest on the foreign developments, for in this way catastrophe had been averted in the American copper industry when the rich deposits of Peru and Chile were brought into production. In the same spirit the Bethlehem Steel Company's tidewater venture at Sparrows Point, Maryland, was watched with considerable interest and some suspicion, for Bethlehem proceeded to draw its supply of iron ore from foreign operations in Spain and Sweden, and from mines more or less under its own control in Cuba and Chile.

Perhaps the conservation of our own finite reserves of bauxite in Arkansas was one of the factors that prompted the aluminum industry to draw upon Dutch and British Guiana for supplies of raw material, but the copper industry experienced panic and consternation when, in the depths of the depression, British, Belgian, and French interests inaugurated large-scale extractive operations along the Rhodesian-Congo boundary. A four-cent tariff warded off disaster for domestic copper producers, and the South American producers were saved only by accelerated industrial production in anticipation of war in 1937.

With the advent of World War II the production facilities of domestic mines were badly strained, and for a time we enjoyed the illusion that the mining industry's inability to meet our needs was due in large part to the shortage of manpower. Since the war, as we have taken inventory of our mineral assets, there has been a slow and reluctant realization of the fact that the domestic reserves of most metals are extremely limited, especially when measured against the annual rate of extraction and industrial consumption. In no other field of mining operation is the transformation as striking as it is in the case of iron ore, and an analysis of developments during the past ten years will provide a pattern into which conservation measures will be cast, not only with respect to iron ore, but also with respect to the ores of the base metals, copper, lead, and zinc.

RESERVES OF IRON ORE

During the boom years of the 1920's iron ore production approximated a peak of ninety million tons. About 85 per cent of this total came from the mines in the Lake Superior district, where reserves were known to be adequate for at least twelve to fourteen years. Thanks to the tax policy of the state of Minnesota, it was not expedient to know any more about subsurface reserves, because taxes were levied upon the owners of unmined ore, and they were based upon proved tonnage. Depression hit the mining districts here, for annual production dropped to a dismal ten to twelve million tons of newly mined ore in the early thirties, and many of the mining communities shriveled to little more than ghost towns. Business picked up later in the decade, and during World War II the annual extraction of iron ore broke the records established in the late twenties.

The heavy drain on the iron ranges of the Lake Superior district has continued since the war, and one by one the mining companies have found it increasingly difficult or impossible to establish the existence of new reserves as rapidly as ore is being mined. Routine drilling, designed merely to extend knowledge of known deposits and to assure a minimum of ten years' supply in any given operation, has been supplemented by new exploration. Known deposits have been explored more thoroughly, and engineering ingenuity has been brought to bear upon the attractive but difficultly accessible deposits of

Steep Rock Lake. The industry has gone even farther afield, and reports of iron ore along the Labrador-Quebec boundary in the Ungava Peninsula have been investigated, with the spectacular discovery that this district, with its formidable climate and its awkward geographic location, probably contains the largest reserve of high-grade hematite ore ever discovered on the North American Continent. The elaborate plans for the development of these deposits have required the revision of economic principles which have long been applied to the iron and steel industry, but there seems little doubt that these deposits will soon be worked during the short summer season and will be disgorging ten million tons or more of iron ore over a railroad that will connect the mines with the Saint Lawrence estuary, 238 miles away.

While one group of operators combed the Pre-Cambrian rocks of North America, applying the modern airborne magnetometer to peer through the glacial drift of the upper lake country, another group looked to Latin America for the solution of its raw materials problem. The Bethlehem Steel Company led the way through its developments in Cuba and Chile; and just as submarine warfare broke into full fury in the Caribbean, this company completed preparations to mine and to ship ore from the Pre-Cambrian Guiana Highlands south of the Orinoco River in Venezuela. Bethlehem's discoveries in Venezuela have since been extended by the United States Steel Corporation, which has undertaken a rival operation in this same general region.

Current interest in Venezuela is the outcome of cautious and exhaustive economic analysis. For several decades the large and rich hematite deposits of Brazil have been known, and during the war years American capital and technological skill were applied to a dual-purpose project—that of erecting a steel mill at Volta Redonda to supply Brazilian needs for steel products, and providing transportation facilities that would permit the export of some Brazilian ore. The fact that the two major operating companies of the United States turned their postwar attention to Venezuela rather than to Brazil is an eloquent commentary on the relative economic advantages of ore production in these two countries. However, the fact remains that one of the largest reserves available to the nations of the Western Hemisphere still lies on the periphery of economic availability in Minas Gerais in Brazil.

MILLING AND METALLURGICAL IMPROVEMENTS

American iron ore producers are not so unimaginative as to think that the discovery of new reserves is the only solution to the problem of impending shortage. For many years they have been interested in the possibilities of beneficiating low-grade ores, and in the Adirondacks beneficiation went beyond the experimental stage nearly twenty years ago. By means of efficient milling operations, deposits in that region that had been abandoned because they could not compete qualitatively with Lake Superior iron ore were reopened, and were milled to such good effect that concentrates could be shipped by rail to mills along Lake Erie and in the Pittsburgh district in competition with hematite from Michigan, Wisconsin, and Minnesota. Likewise, the impressive tonnages of low-grade ore—taconite—in the upper lake country presented a challenge that prompted a great deal of experimentation. Only within the past two years has the problem been effectively solved, and now the taconite deposits seem destined to have commercial significance. To the extent that they can be utilized in competition with the higher-grade ores in the same area, they comprise an impressive extension of our iron ore reserves.

Competition from other metals and from plastics has also been an incentive to metallurgical and engineering research in the steel industry. Variations in furnace treatment and in milling have yielded new types of steel with distinctive properties. In ferrous metallurgy, progress in the study of alloying metals has reached a point where ferrous alloys are no longer the products of empirical recipes but are the results of scientific experimentation. Special properties can now be imparted to steel forms, making it possible for them to compete in many uses with lighter-weight aluminum. And recent developments have made it possible to utilize the titaniferous iron ores and so extend our reserves substantially by the addition of these hitherto unusable deposits.

MEASURES FOR SUPPLYING IRON ORE

The problem of guaranteeing ample supplies of iron ore for American industry is thus being solved in several ways:

1. Foreign deposits are being explored and exploited, not only to supply American mills with raw materials, but also to supply some of the countries concerned with the basic ingredient of domestic steel industries. Conservation is thus effected by importing ore that curtails the drain on United States reserves, and by providing such nations as Chile and Brazil with steel mills that can supply part of the local demand and thereby reduce the export of finished and semifinished steel products from the United States.

2. Private interests and appropriate government agencies have renewed their efforts to find hitherto unknown deposits of iron ore within the confines of this country. Some confidence is felt that geophysical techniques can penetrate the comparatively thin cover of glacial drift and vegetation which mask the iron-bearing Pre-Cambrian formations of the Lake Superior country; and it is probably only a matter of time before the search will be extended to areas in which the overburden consists of younger sedimentary rocks that are not too thick for the economic recovery of ore which may be buried beneath them. In 1951, for example, the United States Geological Survey published the results of aeromagnetic studies in northern Minnesota, and at least half a dozen different localities have been mapped and have been designated as promising for more detailed and definitive ground surveys.

3. Milling techniques have been evolved or improved to the point where concentrates of commercial grades can be obtained by treatment of otherwise uncommercial ores. Technological improvements of this kind brought several Adirondack magnetite deposits into production some time ago, and it now looks as if the taconite deposits of Minnesota will acquire commercial utility and can thus be added to the domestic reserve.

4. Metallurgical research is moving in at least two different but important directions. It is being applied to ores that contain troublesome ingredients—for example, the titaniferous iron ores. And by physicochemical advances in the development of ferrous alloys, it is promoting conservation through the development of alloys that require smaller quantities of iron to yield products of comparable strength, hardness, toughness, and similar qualities.

RELATION TO CONSERVATION

Obviously, not all of these measures fit strictly within the definition of conservation, however liberal that definition may be. The utilization of foreign ores may conserve domestic reserves, but it is not conservation from the standpoint of world reserves. The discovery and development of new domestic deposits may increase our proved resources, but it is hardly conservation. Yet conservation may result from an extension of mining operations, specifically to the smaller bodies of iron ore. Until the mines of the Lake Superior district were opened, the American steel industry depended upon relatively small deposits of iron ore in the Adirondack and Appalachian regions for its major sources of supply. Some of these deposits were mined out; others were mined to the economic limits of depth; others were abandoned because the cost of extraction made the product noncompetitive with iron ore from the Lake Superior country. As noted above, several of the old Adirondack properties have been reopened, but chiefly because improved milling methods greatly increased the reserve of commercial ore and thus provided sufficient reserves for the maintenance of large extractive operations over a minimum period of fifteen to twenty years. Although none of the Adirondack deposits is large in comparison with the Mesabi Range in Minnesota, mine production can scarcely be characterized as small.

In quite a different category, however, is the interest that has been shown during the past two or three years in the small magnetite deposits of northern New Jersey and southeastern New York. Simply stated, the problem here is to determine how small a mining operation can be and still be economic. Some of the ore bodies that have been studied were mined a century or more ago; others were never utilized, either because there was no need for additional tonnage, or because they were commercially unattractive even under contemporary economic conditions. If it should prove feasible to exploit these rather numerous small deposits, the operation will fit under the definition of conservation, because use will be made of raw material that was thrown into the economic discard nearly a century ago.

ATTITUDES OF MINING PROFESSION

The possibility of using the small iron ore deposits in the Appalachians brings up the entire question of official attitude toward marginal mines. The mining fraternity has a strangely inconsistent attitude toward marginal operations; and, as might be expected, there is the usual alignment of small operators against big industry. The large operators have achieved substantial economies by the magnitude of their operations. Through combinations of good management and adequate capital they have either acquired large properties through purchase or concession, or have consolidated adjacent but independent properties to which they have thereupon applied integrated, unified development.

In the latter situation many an independent has found himself forced to sell his property to the large operator, because he could not compete in the labor market, he was unable to command minimum transportation facilities, he was at a disadvantage with respect to smelting facilities and costs. The large operator was rarely helpful in situations of this kind, and the suspicion that his methods may have been designed to force the small operator out was not infrequently well founded. On the other hand, the economies of unit operation of a single, integrated ore body are so well known that they need little argument in their support. With respect to marginal mines, this is not the problem.

The mentality of the mining profession constitutes a unique brand of psychology, in which faith and hope have always been dominent ingredients. Until the Federal Government introduced subsidies into the national economy, independence was a third trait in mining psychology; but from the tone of reports emanating from mining districts and from mining states—for example, from such organizations as the Colorado Mining Association—it looks as if the spirit of independence has been displaced by the all but universal cry for guarantees of security. One gets the impression that every would-be miner who has had the energy and ingenuity to open a hole in the ground feels that he is entitled to a government guarantee that he will not lose money in the operation. Demands for subsidy are nearly always bolstered by statistics that reveal shortages of metals, by appeals to public interest in national security, by denunciations of reciprocal tariff arrangements whereby metals of foreign derivation may compete with domestic raw materials, and by protest against the financial support given foreign mining operations under the Marshall plan and Point Four programs.

The entire problem of government support for marginal mining operations has become so confused in domestic political issues and debatable foreign policies that it is almost impossible to view it dispassionately and in proper perspective. The writer does not pretend that he has done so in the brief remarks that follow.

QUESTION OF SUBSIDIES

For those metals, like iron, copper, lead, zinc, and silver, in the production of which the United States has been essentially self-sufficient, and the reserves of which are still large, even if not entirely adequate for future needs, the principle of subsidies for marginal mining operations is unsound. A single reservation to this statement may be made. During the depression several large mines came perilously close to failure and to abandonment, even though subsurface reserves were far from exhausted. A mine abandoned is a mine lost unless operations are resumed before deterioration of the undeground workings and the equipment sets in. It is definitely worth while to maintain properties in good working condition if they are still capable of supplying a substantial percentage of our normal production. During World War II experience indicated that the tonnage produced in small marginal mines was in general obtained at an expenditure of money, equipment, and manpower that was far from commensurate with the returns. Saner wage and manpower policies in our major mining districts would have enabled the larger operations to yield equivalent tonnages at a much lower expenditure of money and equipment.

From the standpoint of the national economy, the same principle applies in the case of those metals of which our reserves are inadequate for our needs. However, against the practical considerations of economics must be weighed the problem of supply in the event of a national emergency. Security demands the assurance of supplies under any and all conditions; and to meet this situation, marginal mining and stockpiling may logically and legitimately enter the picture.

MANGANESE AND TIN

Perhaps manganese offers as good an example of the problem as any of the scarcer metals, for most of the world's high-grade reserves are located in the Eastern and Southern Hemispheres, and the two largest are in the Soviet

Union. The importance that Germany attached to manganese can be gleaned from the fact that the mining districts along the Dnieper, were the last areas to be abandoned by German troops in the retreat from Russia. From the American standpoint the uncertainty of Soviet deliveries, which reflects official Soviet policy, has been brought forcibly to the consciousness of industrialists and government officials, and the latter not only have aided in assuring a dependable flow of manganese from remote foreign deposits that can be economically operated, but also have vigorously—if not wisely—attempted to increase domestic production from small, low-grade deposits which could not survive in a free, unsupported market, and which could not supply minimum needs in a stringent emergency.

There is clearly some sense in encouraging continued production in such a district as Batesville, Arkansas, and of improving flotation and other milling methods that may bring submarginal deposits within the pale of exploitation and emergency use. At the same time, stockpiling should also be undertaken with a finite objective—namely, to meet minimal needs of the steel industry for a specific period of time, presumably the maximum period during which we may, under most adverse military conditions, find ourselves cut off from our regular sources of supply and reduced to the limited tonnages available from every utilizable domestic deposit and from nearby foreign deposits that can be retained under military control.

In the case of the few metals, like tin, that occur so sporadically and sparingly that any commercial production in the United States has never been successfully achieved, stockpiling provides the only assurance of emergency supplies. Any attempt to operate currently known domestic deposits should be branded as economic idiocy. A case history of tin during the past war should provide Americans with many pointers on solving the problems posed by materials in short supply, but only three phases of the story relate to conservation. First was the effort to conserve tin by making it go farther. It was found that by electroplating, food containers retained all their efficacy with only one-third as much of the metal; and additional savings have been effected by employing some nonrusting substitute, like shellac, for the exteriors of tin cans. It was also found possible to salvage tin even where it was merely a thin coating, and for a time this secondary tin was a most important factor in ensuring minimal supplies.

ELEMENTS IN CONSERVATION

Saving, salvage, and substitution are basic elements in conservation, and they call for all the technological ingenuity at our command if we are to supply Americans in the style to which they are now accustomed and to raise living standards elsewhere in the world. The mineral frontier, which seemed endless in its capacity to yield new sources of raw materials, has all but disappeared insofar as new deposits are concerned. It can be expanded within limits by luck and by the shrewd application of modern and only partly developed exploration techniques. Technology will also enable us to expand our reserves to the extent that metals can be won economically from smaller and/or lower-grade deposits. But in these efforts we are merely finding more raw materials to feed the insatiable furnaces that supply the needs and the luxuries of modern living. It is equally imperative to make what we have go farther by using less without sacrificing effect or efficiency; by reuse through salvage; and by substitution of replaceable raw materials where the same purposes can be equally well served. These kinds of conservation must play an ever increasing part in our metals economy unless we wish to contemplate a future of rigid rationing of many raw materials.

Howard A. Meyerhoff, Ph.D., Washington, D. C., is administrative secretary of the American Association for the Advancement of Science. He formerly served as professor of geology at Smith College, geologist for the Scientific Survey of Puerto Rico and the Virgin Islands, consulting geologist for the Puerto Rican Bureau of Mines and also for the Dominican Government, mediator for the National War Labor Board, chairman of the arbitration board in a large ship repair concern, and technical adviser on the subsurface survey, City of Springfield, Massachusetts. He is author of The Geology of Puerto Rico (1932) and co-author of Flow of Time in the Connecticut Valley (1942).

The Fuel Complex: A Projection

By George A. Lamb

THE United States consumes over 40 per cent of the fuel and water-power energy produced in the world. This energy—processed into many forms of solids, liquids, and gases, besides electricity—provides heat, powers machinery, and satisfies numerous needs that make the country's economy run.

Energy supply was the least of worries during the development of the American economy. The country had abundant resources of coal, petroleum, natural gas, and water power, which permitted a wide choice of energy products to the consumer. Domestic requirements could be readily supplied and export orders fully met. Perhaps, it may be said, this was the situation until several years ago.

The United States has been on an import basis with respect to petroleum since 1948. Its coal and natural gas reserves produce as required, but petroleum reserves have tended to become niggardly about output. Imports of petroleum and its products represent only 12 per cent of the total domestic oil demand. But that they have grown rapidly, and that large amounts of American capital are invested in foreign oil, point to the reality that imports are an established fact in domestic petroleum supply, and their importance will expand. It means that the United States has become sensitive to world supply conditions, and will become more so with regard to petroleum, the largest source of energy it utilizes.

The United States requirements in the world fuel market transactions are modest against those of most countries. World fuel resources of a magnitude that can produce for export are confined to a few areas. Today, the United States is the only country that can offer a substantial tonnage of exportable coal. Venezuela and the Middle East cover the countries that have surplus petroleum in volume. As a result, there are many countries that supplement their indigenous energy supply by competing for fuels in the few areas of surplus. More and more the fuel outlook must be gauged with reference to world requirements and supply if realistic evaluations are to be made.

ENERGY REQUIREMENTS

During 1950 the world required energy from the principal sources in the following amounts:

Coal	1.62	billion metric tons
Petroleum	3.99	billion barrels
Natural gas	7.20	trillion cubic feet
Water power	0.32	trillion kilowatt hours

In addition, the energy supplied by a miscellaneous group consisting of wood, peat, waste material, and other sources, for which reliable figures are not available, may be as large as that contributed by natural gas and water power together; but this group has few potentialities in terms of prospective world technology. Its resources are limited and its fuels are inefficient compared to what is needed in the growing energy requirements.

Converting the principal world energy to a common basis, heat value expressed in terms of British thermal units, coal supplied 57 per cent against 28 per cent by petroleum. Natural gas and water power contributed 9 per cent and 6 per cent, respectively.[1]

---

[1] Heat value is an inadequate standard for measuring accurately the importance between

The 1950 world consumption of energy derived from the principal sources was equivalent to 2.9 billion tons of coal or 14.3 billion barrels of petroleum. On a per capita basis, it was 1.2 tons of coal or 6.0 barrels of petroleum.

The extent to which energy consumption varied between continents and countries is noteworthy.[2] North America, mainly the United States, plus western Europe consumed 66 per cent of the energy while representing 18.6 per cent of the population.[3] Eastern Europe—that is, the Soviet Union and its satellite countries—required 17 per cent of the energy while having 13.9 per cent of the population, although estimates are necessarily rough because of the sketchy material available on that area. On the other hand, South America, Asia, Africa, and Oceania combined used only 17 per cent of the energy although they had two-thirds of the world's population.

During 1950, differences by certain countries in per capita consumption of energy derived from the principal sources, expressed in tons of coal equivalent, are found in the following: United States 8.1; Canada 6.6; United Kingdom 4.5; France 2.3; Union of South Africa 2.3; Soviet Union 1.7; Japan 0.8; Brazil 0.2; and India 0.1. Although these figures have the disadvantage usually attributed to averages, the per capita figures do provide a general index for energy utilization which reflects comparative general industrial development. Stated otherwise, they point to a large potential increase in energy use should there be even a modest relative advance in industrialization throughout the greater part of the world.

SOURCES OF ENERGY

In 1950 the main source of energy consumed in the United States was petroleum, but in the other more industrialized countries of the world it was coal. Western Europe, like the Soviet Union and its dominated countries, depended upon petroleum for only 13 per cent of its total energy requirements. Barrels of petroleum products used per capita in certain countries were: 15.7 in the United States; 2.4 in the United Kingdom; and 1.7 in France and the Soviet Union. Today, Europe consumes coal and petroleum in proportions similar to what they were in the United States during the early twenties.

There are other sources of energy yet to be utilized, one of which is oil shale. Although still to be established on a commercial scale, shale has been explored sufficiently to indicate it as the most promising material for initial synthetic oil production in the United States. Nuclear energy has prospects for general use, though this may not come about on a substantial basis for some time.[4] Solar energy likewise finds many that consider its future promising, but its development lags behind that of

---

energies, since it fails to account properly for efficiency in end uses. It is a convenient index, however, and serves satisfactorily for making general comparisons among energy sources, if allowance is made for its shortcomings.

[2] Basic energy data are taken from publications of the U. S. Bureau of Mines, and the United Nations, except as indicated.

[3] Population data are from the U. S. Bureau of Census and the United Nations. In certain cases it is estimated in part. For example, the world population taken from these sources and conveniently listed on page 1 of the *Economic Almanac 1951–1952* (National Industrial Conference Board) amounts to 2.37 billion in 1949. It is assumed to be approximately 2.4 billion in 1950.

[4] For an analysis of atomic potentials see Sam H. Schurr and Jacob Marschak (Eds), *Economic Aspects of Atomic Power*, York, Pa.: Maple Press Co, 1950. Also see statement of Mr. Philip Sporn, president of American Gas and Electric Co. and chairman of President Truman's Committee on Atomic Energy, reported in *The Wall Street Journal*, Jan. 18, 1952, p. 8.

TABLE 1—APPARENT CONSUMPTION AND SUPPLY OF COAL AND PETROLEUM BY CONTINENTS AND SELECTED COUNTRIES, 1950

	Coal (million metric tons)	Petroleum (million barrels)
North America		
United States	448	2,372
Other	42	262
Total consumption	490	2,634
Excess or deficit in production	+33	−375
South America		
Venezuela	[a]	33
Other	8	161
Total consumption	8	194
Excess or deficit in production	−3	+454
Europe		
Western Europe	515	450
Russia & E. Europe	435	328
Total consumption	950	778
Excess or deficit in production	−6	−437
Asia		
Middle East	4	76
Other	115	117
Total consumption	120	193
Excess or deficit in production	+1	+455
Africa & Oceania		
Total consumption	52	194
Excess or deficit in production	−1	−94
Grand Total	1,620	3,993
Excess or deficit in production[b]	+25	+3

[a] Less than 500,000.

[b] Excess is due to fuel in transit and in storage.

Sources: U. S. Bureau of Mines; also reference to United Nations documents and "Demand to top 4.4 Billion Barrels," *World Petroleum*, Vol. 22, No. 10 (Sept. 1951), pp. 40–42. Consumption partly estimated for certain countries.

nuclear energy. It appears that during the rest of the century, if not longer, most of the energy supply will continue to be derived from coal and petroleum.

ENERGY GROWTH

World production of the principal energy sources has increased steadily since World War I, although at different rates. Natural gas, produced and used mainly in the United States, has had the most rapid rate of advance. Petroleum products have had a continually expanding world market which reflects developments of motor vehicles, aircraft, and other mechanical applications. The growth of water power for electric power generation has tended to slacken since the thirties, following years of speedy development. Coal's increase is attributed largely to the demand for solid fuels in Europe.

FUEL PROJECTIONS

Past energy developments give rise to interesting speculation about the future world requirements for coal and petroleum, and how they will be supplied. On the one side, the steady increase in energy needs that has taken place will apparently continue. On the other side, the tendency for the greater portion of coal and petroleum supply to rest more and more on the output of a few countries will have the result that satisfying requirements will become increasingly complicated with each succeeding year.[5] Possibly within this dec-

---

[5] World coal reserves are rated by Paul Averitt and Louise R. Berryhill in *Coal Resources of The United States*, Circular 94, p. 26 (U. S. Geological Survey, Nov. 1950). Distribution of the major reserves is: United States 40 per cent, Russia 21 per cent, China 18 per cent. Germany and the United Kingdom have 6 per cent and 3 per cent respectively. Location of the major petroleum proved reserves is: 50 per cent in Middle East, 25 per cent in the United States, 10 per cent in Venezuela. *Petroleum Facts and Figures*, 9th Ed., 1951 (New York: American

TABLE 2—WORLD PRODUCTION OF COAL AND PETROLEUM, INCLUDING NATURAL GASOLINE

	Coal[a] (million metric tons)			Petroleum (million barrels)		
	1920	1937	1950[b]	1920	1937	1950[c]
North America	*613*	*467*	*523*	*610*	*1,380*	*2,259*
United States	597	451	505	452	1,328	2,154
Other	16	16	18	158	52	105
South America	*2*	*3*	*5*	*8*	*260*	*648*
Venezuela				[d]	186	549
Other				7	74	99
Europe[e]	*532*	*814*	*944*	*42*	*275*	*341*
Western Europe	454	565	500			
Eastern Europe	78	249	444			
Africa	*11*	*17*	*28*			
Asia	*70*	*117*	*121*	*23*	*130*	*648*
Middle East				12	117	641
Far East				11	13	7
Oceania	*16*	*17*	*24*			
World, other				*21*	*71*	*100*
World Totals	1,244	1,435	1,645	704	2,116	3,996

[a] Lignite converted on basis: 2 tons lignite = 1 ton bituminous coal, except for higher-grade lignite of North America.

[b] Preliminary.

[c] Preliminary and partly estimated.

[d] Less than 500,000 barrels

[e] Includes Asiatic U.S S.R. production.

Sources: Coal: U. S Bureau of Mines; also reference to United Nations and League of Nations documents. Petroleum: U. S. Bureau of Mines; reference also to United Nations documents; *Energy Resources of the World*, Washington: Department of State, 1937.

ade, conditions may force considerable changes among the uses of fuel. Certainly within the next twenty-five years, the world fuel structure will have quite a different appearance from what it has today.

What may the world fuel situation be in twenty-five years? By then, population will have increased; technology, industrialization, and other components of the world economy will have advanced, providing global conditions are no worse than they have been. This economic growth may come about at a rate that corresponds to a past period.

Based upon 1937 to 1950, world requirements during the next twenty-five years will increase 27.5 per cent for coal and 170 per cent for petroleum. Coal projects to 2.1 billion tons and petroleum to 10.8 billion barrels. The two projections combined represent a growth of 74 per cent in British thermal units (Btu's). Natural gas may be excluded in the world calculations, since

---

Petroleum Institute), p. 443 Also estimates of D. M. Duff, "Middle East Accounts for More Than Half of Global Petroleum Reserves," *Oil and Gas Journal*, Vol. 50, No. 33 (Dec. 20, 1951), pp. 224 and 227.

TABLE 3—WORLD ENERGY SUPPLY, 1937 AND 1950

Source	1937		1950		Per cent increase
	Quadrillion Btu's	Per cent of total	Quadrillion Btu's	Per cent of total	
Coal[a]	41,491	68.8	47,541	57.1	14.6
Petroleum[b]	12,280	20.4	23,175	27.8	88.7
Natural gas[c]	3,023	5.0	7,740	9.3	156.0
Water power[d]	3,483	5.8	4,836	5.8	38.8
Total	60,277	100.0	83,292	100 0	38.2

[a] Metric ton = 28.9 million British thermal units.

[b] 1 barrel = 5.8 million Btu's.

[c] 1 cubic foot = 1,075 Btu's.

[d] In 1937, 1 pound of coal was equal to 1.44 kilowatt-hours; in 1950 it was equal to 1.19.

Sources: U. S. Bureau of Mines; United Nations; *Energy Resources of the World*, U. S. State Department, Washington, 1937.

its use is confined primarily to the United States. Water power—a comparatively small energy source—also may be excluded on the basis that it will expand in proportion to total energy requirements.

In the United States, requirements for total energy—as derived from the combination of coal, petroleum, natural gas, and water power—will double in twenty-five years according to the 1937–50 experience. This will amount to 70.4 quadrillion Btu's. Petroleum and natural gas taken alone, because of their steady increase in the base period and subsequent greater volume in the years that follow, will account for 65.2 quadrillion Btu's, or most of the requirements. Allowing water power to double in output, practically nothing will be left for coal on the basis of 70.4 quadrillion Btu's. But because there are certain uses that cannot be satisfied by petroleum, gas, or water power, for instance in steelmaking, coal probably will retain at least half of its volume, making the requirements for the other energy sources somewhat less than their particular projections indicate. This is the sort of situation that may result if petroleum and natural gas are as readily available as they were during 1937–50.

TABLE 4—PROJECTED WORLD REQUIREMENTS OF COAL AND PETROLEUM
(Quadrillion Btu's)

	Actual 1950	Projected 1975	Per cent increase
Coal	47.5	60.6	27.5
Petroleum	23.2	62.6	170.0
Total	70.7	123.2	74.0

Conditions in the rest of North America will relate to those in the United States. Europe, on the 1937–50 experience, will have a 50 per cent growth (about 450 million tons) in coal consumption—most of the world increase for this solid fuel. South America and Asia will expand coal demand by 50 per cent, and Africa and Oceania together will require 70 per cent more tonnage.

The advance in petroleum demand of 170 per cent for the world will be represented by a 190 per cent increase for the United States and a 160 per cent increase for the rest of the world. In Europe it will double, the increase in western Europe being 130 per cent and that in eastern Europe being 50 per cent. Other increases of smaller volume are 150 per cent in Asia, and 400 per cent in South America and Africa-Oceania.

Few countries can look to anything but coal and petroleum to supply their increased fuel requirements. Natural gas will be a major fuel in the United States, but it offers no significant prospects elsewhere except in Venezuela and Canada, and to a less extent in a few other countries. This is exclusive of what may be done with the supposedly large gas reserves of Russia.

SUPPLY PROBLEMS

Prospective supply difficulties center around two situations. First is the likelihood that western Europe will be unable to acquire the increased amounts of coal to meet its greater energy requirements. Figured on a straight projection of 1937 to 1950, it will need 20 per cent more coal in 1975; but if allowance is made for its supply scarcity since World War II, it will probably need 50 per cent additional tonnage, or 250 million tons. Western Europe, confronted with poor mining conditions and high costs, does not demonstrate that it can better its present production 10 per cent, much less 50 per cent.[6]

The United States could enlarge its mining facilities to produce the extra coal that western Europe may need. Unfortunately, the tonnage might have to be delivered at comparatively high cost to the consumer because of transportation and handling charges. United States coal delivered to overseas buyers at costs ranging from $20 to $25 per ton, as prevailed during 1951, three-fourths represented in shipping charges largely because of vessel rates, would push European fuel budgets beyond economic reason.[7]

A reduction in these shipping charges is probable, but whether they can be lowered to the point to permit the general flow of coal to Europe economically over the long run raises a doubt.[8] The reduction may permit the movement of by-product and other special-quality coals which may be as much as 50 million tons yearly, although hardly a tonnage several times larger which Europe may be required to import to satisfy total coal needs. Little help can be expected from the Soviet Union, which must expand its mining to supply its growing coal requirements. Hence, if western Europe is to have adequate energy in the years ahead, it will look for a source other than coal. Petroleum is the only source left that has potentialities.[9]

The second major supply difficulty concerns petroleum in the United States.

---

[6] Coal production in western Europe has relatively high costs because of physical mining conditions and the inability to utilize mechanization in the same degree as in the United States In October and November 1950, output per man-shift was 1.2 tons in Great Britain, 1.1 tons in Western Germany, and 0 8 ton in France. It was 6.1 tons for bituminous coal in the United States in 1950. *International Coal Trade* (U. S Bureau of Mines), Vol. 20, No. 2, Feb. 1951.

[7] *Saward's Journal*, Vol. 34, No. 42 (Jan. 1952), p. 585, quotes ocean single-trip rates per gross ton on coal from the eastern United States as follows: United Kingdom about $12.00; Antwerp $10.50 to $11.25; Italy $11.70 to $14.00. Western Europe imported over 25 million tons of coal from the United States in 1951.

[8] During the early part of 1952, a joint UMWA-coal operators shipping pool was under consideration for the purpose of leasing and operating government surplus ships The proposal was to operate ships at cost in order to reduce delivered coal costs at foreign ports. See *United Mine Journal*, Vol. LXIII, No. 1 (Jan 1, 1952), p. 10.

[9] Petroleum also has lower transportation costs than coal. The maximum price on heavy fuel oil in New York Harbor was $2.45 per barrel, equivalent to coal at $10 per ton, during much of 1951. Oil from Venezuela and the Middle East was delivered at this price, or about half what it cost to deliver the equivalent of American coal in Europe.

It has been estimated, with certain qualifying conditions, that peak petroleum production in the United States may be reached by 1960 and possibly before.[10] Much oil will be produced from the country's reserves following the peak performance, but eventually at a declining rate. Estimators of the peak outlook further hold that indigenous petroleum may supply only 10 per cent of the country's total oil requirements at the end of the present century.

The world peak in petroleum production may appear in 1985[11] as figured with regard to various considerations, one of which is that the world reserves ultimately producible total one trillion barrels, larger than sometimes cited. Furthermore, it is held that world production may have a peak no larger than 7 billion barrels per annum. If the latter proves to be the case and the demand for oil approximates the increase projected—that is, a growth from 4 to 10.8 billion barrels in twenty-five years—a shortage in petroleum may develop within the next dozen years.

BALANCING OUT

Interrelating requirement and supply prospects, what may be the consumption of coal and of petroleum twenty-five years hence?

In the United States, a number of changes will take place. Where the requirement trends show coal as a solid fuel losing half of its volume, while petroleum and natural gas are advancing 190 per cent and 200 per cent respectively, the addition of supply factors present a different outlook. This is true even if it is liberally assumed that natural gas will have the production volume to take care of its demand growth.

PETROLEUM IN 1975

Petroleum production in the United States, should it reach a peak by 1960, would be at a comparatively low level by 1975. One forecast indicates that it may be no larger than 1 billion barrels annually by the early seventies.[12] Still, if it were as high as 2 billion barrels in 1975, then against a projected oil demand of 6.9 billion barrels there would be a difference of 4.9 billion barrels to be supplied from other sources.

Petroleum imports will be one way to supplement domestic supply, but in a limited manner. They amounted to 309 million barrels last year and in 1950. Canada will be the origin for part of the imports, but Venezuela and the Middle East will be the source for most of them. To have imports furnish the greater part of future domestic needs would depend upon a gigantic fleet of tankers besides the availability of foreign petroleum. The latter apparently will be wishful thinking, since the rest of the world likewise will be bidding for petroleum and will attempt to take all that is produced. An allowance of 1 billion barrels for imports in 1975 may be too large, but such a volume would still leave a deficit of 3.9 billion barrels in oil supply.

Prices will keep oil to its more essential uses and will encourage technological advancement in the development of new supply to offset petroleum scarcity. Oil for motor vehicles, aircraft, and other motive equipment will be a principal requirement. Its uses for space heating and under boilers for raising industrial steam will diminish in volume by necessity. In 1950, about 800 million barrels, one-third of the total domestic oil demand, was consumed for heat and boiler-plant steam. At the same time, 1.1 billion barrels of gasoline, diesel oil, and other light oils was required for motor fuel—41 per cent of total demand. Assuming that in 1975 gasoline and other motor oils would have a demand of 3 billion barrels, approximately the proportion of total oil demand they presently have, and that oils for other uses would be restricted, petroleum requirements could be substantially lowered. Instead of needing 6.9 billion barrels, probably 3.5 billion barrels of petroleum would yield the needed motor and other essential oils. This would leave a deficit of 500 million barrels after domestic petroleum and imports accounted for 3 billion barrels.

---

[10] Eugene Ayres and Charles A Scarlott, *Energy Resources—The Wealth of the World* (New York: McGraw-Hill Book Co., 1952), p. 40.

[11] Eugene Ayres, "Synthetic Liquid Fuels—When and How," *Petroleum Processing*, Jan. 1952, p. 41.

[12] Eugene Ayres and Charles A. Scarlott, cited note 10 *supra*, p. 42.

Shale oil would supplement supply, probably to the amount of 300 million barrels.[13] The great deposits of shale vary widely as to minability and oil content, and those that could be processed within a reasonable cost range apparently would not support a production beyond this figure.

SYNTHETIC OIL

Supplying the remaining 200 million barrels of oil would fall upon coal. Oil can be made from coal by various processes, any one of which is now in a preliminary stage and will probably be improved a great deal with further investigation.[14] Thermal inefficiency in conversion is a major problem; about half of the heat value of the coal used is lost in processes like hydrogenation and Fischer-Tropsch. A ton of coal instead of making four-plus barrels of oil makes only two.

An initial approach to synthetic oil output may be through the recovery of tar from coal through low-temperature carbonization and use of the principal resulting product—char or semicoke—for a solid fuel and additional synthetic output. The 40 gallons of tar taken from a metric ton of coal can be converted into oils with a high degree of efficiency.[15] This process may well take care of the 200 million barrels of oil needed to balance supply in 1975, and has potentialities for supplying much more. Five hundred million tons of coal used in this process would be the basis for about 450 million barrels of motor fuel and related products, and 350 million tons of char.

A char market will have limitations if confined to solid fuel, but may be unlimited if extended to the raw material needed by other synthetic oil processes. These other processes where the entire ton of coal or char is used for oil making will have to be employed as the spread enlarges between what oil is needed and what can be supplied through domestic petroleum, imports, and shale. Their potentialities from a cost standpoint still need a great deal more exploration before satisfactory determinations can be made as to what process is to offer the greatest advantages.[16]

---

[13] Eugene Ayres, "Synthetic Liquid Fuels," cited note 11 *supra*, p. 44.

[14] Eugene Ayres and Charles A. Scarlott, cited note 10 *supra*, p. 114.

[15] See *Petroleum Processing*, Vol. 7, No. 1 (Jan. 1952), p. 45, for an interesting account of the possibilities in low-temperature carbonization.

[16] It has been estimated that the large-scale conversion of the better-quality shale into motor fuel can be made presently at a cost of 14.7 cents per gallon—slightly more than 3 cents above the average refinery price. Coal hydrogenation is figured to cost 41 cents per gallon. See *Report of The National Petroleum Council's Committee on Synthetic Liquid Fuels Production Costs*, Washington, Oct. 31, 1951. The U. S. Bureau of Mines estimates that the hydrogenation process is less costly than the Petroleum Council's figure. Current figures on the Fischer-Tropsch process are not available, but some contend they will give a lower cost than estimates for hydrogenation.

HEATING AND STEAM FUELS

What about the requirements for heating and steam fuels that were to be but could not be supplied by oil? This may be harder to answer satisfactorily than the question of meeting demands for motor and other essential oils. Substitute energy to displace 3.4 billion barrels of oil is not readily available if it is to be consumed without economic hardship.

It takes about 700 million tons of coal to furnish the Btu's in 3.4 billion barrels of petroleum. Presently, coal can displace oil for some uses with little if any additional cost and without any loss in thermal efficiency. These uses consist of fuel for large boiler operations such as at electric utility plants and even at oil refinery plants located in certain areas. They will be fueled more with coal as oil tends to become scarce and its price rises. In less than twenty-five years, most of the boiler fuel that had been oil will consist of coal. Probably as much as 1 billion of the projected 3.4 billion barrels can be displaced directly by coal.

The amount of oil used for heating residential and commercial buildings totaled 400 million barrels in 1950.[17] It projects to 1.3 billion barrels, or 260 million tons of coal in heat equivalent, in 1975. Here the question of convenience to the user often is the controlling factor in selecting fuels, and it will be more so. Part of the heating requirements can be supplied by the use of central coal plants. These plants now operate satisfactorily in a number of places, especially in concentrated city areas. They are economical and provide a convenient heat. Electrical heating, now installed on a modest scale, features convenience and potential economies. It fits into the scheme of building equipment and furnishing which is tending towards electrification. Probably it will eventually become a major supplier of space heat on its own merits. Coal-generated electricity will likely furnish heat at a cost comparable to the current cost of oil heat. If this develops, then central plants and electrical units with coal as the energy source can displace 1.3 billion barrels of oil heat with thermal equivalent and, moreover, with added convenience.

While 2.3 billion barrels of oil can be displaced through the substitution of coal in boiler plants and as an energy source for space heating, there remains to be supplied 1.1 billion of the projected 3.4 billion barrels. This consists of fuel for ship bunkers, railroads, processing in manufacturing plants, and a variety of additional requirements. Much will depend upon technological advance if coal is to displace oil for these particular uses and higher relative fuel costs are to be avoided. The coal gas turbine, now under development, may provide the way for decreasing oil for bunker and railroad needs as well as for other purposes. Electric power may be used more extensively for railroad transportation. It also may serve in place of oil for many processing needs. Furthermore, oil made from coal may be utilized if synthetic production is advanced as some think it will be. A great deal has to be done in the efficient substitution of coal for oil, but there is evidence that it can be done for numerous uses within a twenty-five-year period.

SITUATION IN NORTH AMERICA

Under this sequence of fuel developments, adequate energy would be available to the United States in 1975. One billion metric tons of coal would supply solid fuel needs and be the source for 200 million barrels of motor fuel and for energy for space heating and other purposes now serviced by petroleum products. Shale oil would contribute 300 million gallons of motor fuel. Three billion barrels of petroleum would be the source for motor and other essential oils.[18]

---

[17] *Bituminous Coal Annual* (Washington: Bituminous Coal Institute, 1951), p. 135.

Outside the United States, the fuel outlooks vary widely depending upon the country or continent considered. Canada has a promising oil and natural gas production, but, taking into account a rising energy demand, it still will need a larger coal tonnage. It is estimated that Canadian coal requirements will double in twenty-five years to an approximate 80 million tons, with no allowance for synthetic oil output or any special displacement of oil.[19] Half would be supplied by the United States. Like the United States, the other countries of North America will require continually greater volumes of oil.

SITUATION IN EUROPE

There is no indication that western Europe will be able to expand its coal supply through production and imports to anything like 250 million tons in the future years. Most of this additional fuel will have to be secured from a source other than coal. In the circumstances, a billion barrels of fuel oil may go a long way towards making fuel supply adequate in 1975.

Western Europe likewise is going to require sizable additions to motor and related oils. Projections, even though reflecting austere living since World War II, point to a twenty-five-year increase in motor fuels of 100 per cent, or to 1 billion barrels. The increase may be twice as great. Thus in 1975 western Europe may be taking 3 billion barrels of petroleum from the Middle East and from where else it can be had. A sixfold growth in oil consumption like this may appear to be fanciful at first glance, but it is similar to what happened in the United States between World War I and 1950. It is probable if world production and transportation of petroleum develop as assumed. Moreover, the per capita consumption in western Europe in 1975 would be only 8 barrels, compared to the present 16 barrels in the United States.

Eastern Europe apparently will be better situated to enlarge its production of coal and petroleum, and probably natural gas. It already has made good strides in coal mining and should be able to reach the 650 million tons projected. Russia may develop crude oil output in view of its supposedly large petroleum reserves. Eastern Europe's twenty-five-year projected oil consumption amounts to only 500 million barrels. An increase to 1.5 billion barrels is not too much to expect, especially if eastern Europe attempts to maintain an energy position comparable to the one assumed for western Europe.

SITUATION OUTSIDE NORTH AMERICA AND EUROPE

North America and Europe account for most of the energy to be consumed. The remainder of the world, however, will plan to use more coal and petro-

---

[18] "A Billion-Ton Year For Coal?" *Mechanization,* Vol. XV, No. 11 (Nov. 1951), pp. 89–100, makes an estimate of future energy requirements on a different basis. It assumes that the energy load of the country may double in twenty-five years under certain conditions. It arrives at a different fuel setup, since, for one thing, it is figured that the United States will have 6 billion barrels of petroleum available in 1975. This article is further analyzed by George A. Lamb, D. L. McElroy, and Joseph Pursglove, Jr., in "There's Coal in Your Future," *Utilization,* Vol. 5, No. 12 (Dec. 1951), pp. 29–38. Eugene Ayres, "Synthetic Liquid Fuels," cited note 11 *supra,* p. 44, believes that a demand of 3.5 billion barrels of motor fuel by 1980 is a plausible figure. This compares to the 3 billion barrels in 1975 used in the assumptions.

[19] Estimate furnished by letter from C. L. O'Brian, Assistant to Chairman, Dominion Coal Board, Ottawa, Canada.

TABLE 5—USE OF COAL AND CRUDE PETROLEUM IN 1975, COMPILED WITH REFERENCE TO CERTAIN ASSUMPTIONS

	Coal		Petroleum		Total Quadrillion Btu's
	Million metric tons	Quadrillion Btu's	Million barrels	Quadrillion Btu's	
North America	*1,100*	*31.8*	*3,500*	*20.3*	*52.1*
United States[a]	1,000	28.9	3,000	17.4	46.3
Other	100	2.9	500	2.9	5.8
Europe	*1,250*	*36.1*	*4,500*	*26.1*	*62.2*
Western	600	17.3	3,000	17.4	34.7
Eastern	650	18.8	1,500	8.7	27.5
World, other	*250*	*7.2*	*2,300*	*13.3*	*20.5*
World, totals	2,600	75.1	10,300	59.7	134.8

[a] In addition, oil shale would supply 300 million barrels of oil.

leum—a prospect that may be underestimated. It used 180 million tons of coal in 1950, and it is conservative to say it will use 250 million tons in 1975. It will have the greater part of the petroleum reserves and two-thirds of the population, or 2 billion persons. Its 1975 oil consumption would be 600 million barrels projected from 1937–50 trends, but it could easily soar to at least 2 billion barrels—1 barrel per capita. If countries on continents like South America and Asia advance their economies as they plan to do, there will be a great demand for fuel energy, and petroleum will be the attractive source.[20]

In the circumstances outlined, world energy requirements for coal and petroleum in 1975 amount to 135 quadrillion Btu's, 10 per cent higher than projected upon the 1937–50 basis. This comes about mainly because of allowances for certain additional energy growth outside of North America.

DEVELOPMENTS IN SUPPLY

Supply has some interesting developments under the conditions set forth. In North America, coal once more regains the prominent position as an energy source. This occurs while Europe, which has been principally a coal consumer, turns to petroleum for a good part of its energy supply. Western Europe, with petroleum reserves of no consequence and the world crude production on the decline during the late part of the century, with coal reserves that offer limited production, has dim prospects for energy supply in the distant future.

Events do not have to be greatly unlike those assumed to bring about a different fuel situation in 1975. Peak petroleum production in the United States may come in 1970 or later, rather than in 1960. It may not be reached in the world until 2000. Similarly, fuel needs may not be so large as expected. World progress may be at a slow pace if at all. The fuel setup suggested for 1975 may not be approximated for decades after that time.

---

[20] Arthur D. Stewart, "World Demand to Continue Upward Trend," *Oil and Gas Journal*, Dec. 20, 1951, p. 270, estimates that the world outside of the Soviet Union and its satellites will require one-third more oil in the next ten years. Increases are general.

Similarly, it may be argued that the decline in petroleum output will start sooner than expected. Fuel requirements ahead may be underestimated, as is often the case, instead of overestimated. A new era of world advancement is about to start. Hence, a transition in fuel supply may be well underway in another ten years.

Serious thinking about the undertakings that may be necessary to assure adequate supply in the future should not be discouraged by various opinions on details of fuel outlook. That substantial fuel changes may not have to be effected until ten or twenty years later than some predict offers no respite in light of what may have to be done.

Shifting energy sources to supply increasing energy needs will be a venture of staggering proportions. Should coal and petroleum be utilized to provide energy in 1975, as assumed, it could only be the result of foresight, careful planning, and wise execution by the fuel industries. Consumers, likewise, would have to have been understanding and co-operative.

TRANSITION IN UNITED STATES

An annual coal production in the United States of a billion metric tons, twice the present rate, does not seem to present difficulties at first glance. And it would not if the increased capacity could be added gradually in accordance with its long-term as well as immediate needs. Investment could be attracted, mines developed, manpower trained, and transportation supplemented. But if past events are a yardstick, there is the danger that expansion will not come about so smoothly. A billion tons of coal may be urgently needed in 1975; half that volume will be plenty this year and likely during the years ahead while oil and natural gas remain in apparent abundance. Necessity for coal expansion may not be fully realized until there is actually a fuel shortage. Then development of additional mining will be rushed to completion with all the disadvantages of emergency application. Consumers will pay more for their energy as a consequence.

Coal mining development is but one phase of the complex transition in prospect for the American energy structure. Facilities for generating greater volumes of electricity, producing synthetic oil, and processing other energy products, will take new technology, and also an investment, along with steel and other materials, of a magnitude that might be needed to support another world war. Changes in equipment to permit utilization of the new energy supply will entail vast expansions in manufacturing and in consumer expenditures.

Only part of the great money and materials outlay applied to the transition may be in addition to what the outlay would have been had petroleum been plentiful and supplied to satisfy increasing energy needs. But the transition will be a departure from conventional practice. The change-over will have to be started well ahead of its need, or later fuel requirements will not be met. This is not the sort of undertaking that gets enthusiastic backing. It may not appear possible to formulate a sound fuel program, generally acceptable, which will move the country towards preparation that will assure adequate energy supply twenty-five years from now. This is but to admit that the country can afford to take a chance on an energy shortage, on the costly rehabilitation of energy supply on an emergency basis, and suffer no loss in the end. And such shortage and attendant cost will happen unless serious thinking and effective action are given to the future fuel situation.

TRANSITION OUTSIDE OF UNITED STATES

Fuel developments will be even more complex outside of North America. In supplying the major part of the increased energy load, the utilization of petroleum needs to be broadly established and its production greatly expanded. Plant and equipment using oil, like oil refining and transportation capacities, will take a tremendous outlay of capital if energy requirements are to be supplied in 1975. In many countries, the undertaking will be of proportions never before considered.

If it is imperative that countries of western Europe and the other Allies strengthen their economies, it is likewise imperative that they have access to more energy, with petroleum the likely source. Ways and means will have to be devised so that the necessary petroleum can be acquired and used, or the Allies will get nowhere in their quest for economic strength. Countries opposing the Allies, too, will look towards petroleum for additional energy in the attempt to maintain their position. Conditions like these may soon force the demand for petroleum upward at an accelerated rate.

Petroleum requirements outside of North America in 1975 may be quite different from those assumed, without changing the energy position of the United States very much. They may total 5 billion or even 10 billion barrels instead of the 7 billion barrels projected, and the outlook is about the same. Five billion barrels would make it easier to acquire imports which may be limited in volume regardless. Ten billion barrels would reduce imports substantially, which would advance the production of synthetic oils and other energy products to offset the foreign oil deficiency. Thus, as projections extend further into the future, the United States must become more self-sufficient in fuel supply if its energy requirements are to be satisfied.

George A. Lamb, Pittsburgh, Pennsylvania, is manager of business surveys for the Pittsburgh Consolidation Coal Company. He has served as assistant director of the United States Bureau of Mines and as economist with the Department of the Interior and the Interstate Commerce Commission. He is author of a number of technical articles dealing with fuel matters.

Adequacy of Our Mineral Fuels

By Robert E. Hardwicke

IT is impossible to isolate or value the most important influences in the United States that have brought about our well-being, especially our physical comfort, but surely the extensive use of inanimate energy resources is one of them.[1]

Blessed with enormous supplies of coal, petroleum, and falling water, we have been ingenious in their employment. Although our population has doubled since 1900, each of us on the average has today four times as much inanimate or mechanical energy working for him as each individual had in 1900. Americans, per capita, use ten times as much inanimate energy as do the people of the rest of the world.[2] Fortunately, this energy has been employed in such a manner and under such conditions as to make a major contribution to causes leading to our high standard of living.[3]

Perhaps more than any other country, we are committed to an economy that is based heavily on the use of gaseous and liquid fuels. In 1945, about 56 per cent of the energy of oil was used in transportation. Apparently the percentage has not since materially changed.[4] About 25 per cent of all energy used in the United States at the present time serves to run mobile equipment.[5] A lack of adequate supply of fuels might be disastrous.

The following questions are therefore pertinent: (1) How large are the known and prospective reserves of mineral fuels in the United States? (2) What is the likelihood that an adequate supply, particularly of gaseous and liquid fuels, will be available for a long time at reasonable prices? (3) What is being done and what should be done to minimize the waste of our supplies in producing operations? (4) What other sources of energy are available if present sources of mineral fuels become inadequate? (5) What is the existing national policy with respect to mineral fuels? (6) Should a different policy be adopted?

---

[1] "The extent to which a nation employs [inanimate] energy resources is a definite indication of the level of living which its people enjoy." Arthur A. Sandusky, *et al., Basic Data Relating to Energy Resources* (1951), p. xv. The reference is to the report of a study made for the Committee on Interior and Insular Affairs pursuant to S. Res. 239, 81st Congress, authorizing the Committee to investigate available fuel reserves and formulate a national fuel policy for the United States. The study was made under the supervision of Arthur A. Sandusky, a member of the professional staff of the Committee, with the assistance of specialists from the Department of the Interior and the Legislative Reference Service of the Library of Congress. The 226-page report contains an enormous amount of valuable data. Since it will be referred to frequently, a short title, *Basic Data,* will be used.

[2] Richard J. Gonzalez, "What Makes America Great," *The Humble Way* (Houston, Tex., May–June 1951), p. 5.

[3] Dr. Erich W. Zimmermann in his monumental work, *World Resources and Industries* (Rev. ed., New York, 1951), devotes chapter 6 to a critical discussion of energy expenditure and well-being. He points out that, though a general positive correlation exists between energy expenditure and wealth or well-being, it does not necessarily follow that the correlation is accurate.

[4] Eugene Ayres, "Major Sources of Energy," *Proceedings 28th Annual Meeting, American Petroleum Institute, 1948* (New York, 1949), Sec. III (Refining), pp. 109, 142. This paper contains an extraordinary amount of valuable information with respect to sources of energy.

[5] Committee on Oil and Gas Availability, *Petroleum Productive Capacity* (a report on present and future supplies of oil and gas made on Jan. 29, 1952 to the National Petroleum Council), p. 83.

A short answer to the second question may now be given: A continuation of our present policy of competition and freedom of individual initiative will ensure for a long period adequate supplies of mineral fuels, including liquid and gaseous, at reasonable prices.

Unquestionably, an adequate supply of liquid and gaseous fuels is of tremendous importance to this country. Ease of mobility and a lessening of man's physical burdens have consistently accelerated the progress of civilization.[6] The wheel, the sail, the steam engine, the internal-combustion and electric motors are points on the lines that mark the upward trend of ease of mobility, and the substitution of inanimate for animate work. Those lines closely parallel the lines of advancing culture.

In the United States in 1850 man did 15 per cent of the physical work, animals 79 per cent, and machines 6 per cent to produce in one man-hour goods worth 27 cents; in 1930 man did 4 per cent of the work, animals 12 per cent, and machines 84 per cent to produce in one man-hour goods worth 82 cents; and it is estimated that in 1960 the percentage will be man 3 per cent, animals 1 per cent, and machines 96 per cent to produce in one man-hour goods worth $1.61.[7] The figures indicate that a high level of living is now enjoyed in the United States.[8]

The existence of great supplies of energy resources, raw materials, manpower, and capital was an important factor in our progress, but perhaps the greatest factors of all were intangibles: social and political philosophies that encouraged individual initiative and competition. These philosophies offered to an unusual degree an equality of opportunity, and fostered conditions that challenged the individual to realize his capabilities, with consequent benefit to the country.[9]

At this very moment, as an outgrowth of our social and political philosophies, we are witnessing a dynamic conflict of great forces: the competition of exhaustible mineral fuels (oil, natural gas, and coal) among themselves and with hydroelectricity. The severity of the conflict is indicated by the following figures given in round numbers: in 1900, on a Btu (British thermal unit) basis of comparison, the output of mineral fuels and water power was as follows: coal 88 per cent, oil and gas 8 per cent, and water power 4 per cent. In 1925 the percentages were: coal 70 per cent, oil and gas 27 per cent, and water power 3 per cent; while in 1949 the figures were: coal 40 per cent, oil and gas 55 per cent, and water power 5 per cent.[10]

---

[6] Zimmermann, *op. cit.* note 3, pp. 71 and 138.

[7] J. Frederic Dewhurst (Ed), *America's Needs and Resources* (New York, 1947), pp 680–82. Such information is shown in pictographic form in *U.S.A., Measure of a Nation* by Thomas R. Carskadon and Rudolf Modley, and on the back of the front page of *Popular Economics* for December 1951.

[8] Zimmermann, *op. cit.* note 3, p. 58.

[9] *Basic Elements of a Free, Dynamic Society* (New York, 1951), pp. 19 and 78. The booklet cited is a condensed record of a round-table discussion held in April 1951. The participants were outstanding executives, educators, authors, and editors. The condensed record also appears in the *Harvard Business Review*, Part I in the issue of November 1951, and Part II in the issue of January–February 1952.

[10] *Basic Data*, pp. 7–8; Zimmermann, *op. cit.* note 3, pp. 483–85. Zimmermann emphasizes that the figures deal with output, not

Tomorrow the figures may indicate a different trend, for no fuel has suffered a hopeless defeat. New techniques are being employed, and, to add to the problems of competition, new combatants, such as solar heat, wind and tides, and even atomic energy, may soon participate with vigor in the battle royal. Experience gives us the right to believe that the public will be the benefactor.

RESERVES OF MINERAL FUELS

Although enormous supplies of mineral fuels exist within the United States, these supplies are unfortunately nonreplenishing. They can be exhausted. Prudence suggests, then, that we take stock of known recoverable reserves, and consider the probability of increasing them materially.

Coal

The total of the reserves of commercially recoverable coal of all classes, assuming 50 per cent recovery of the basic reserves, was recently estimated to be about 1,213 billion (1⅙ trillion) short tons as of January 1, 1950,[11] while the total production for 1949 was about 480,600,000 net tons, or only a small fraction of the reserve.[12] A more accurate survey of the coal reserves would doubtless result in changing the basic reserve figures, either up or down, and many factors, such as prices, technology, and availability, would influence the percentage recovery to be used in any new estimate; but it is not likely that there will be any shortage of reserves of coal for a long time.

Petroleum (*oil and natural gas*)

Few have been willing to estimate potential reserves or the total quantity of petroleum that will eventually be produced in the United States. A true saying in the petroleum industry is: oil and gas are where you find them, they are looked for in many places where they ain't, and they are found in large quantities where they ain't supposed to be. So far, each estimate of reserves given for a date or period in the future not close to the date of the estimate has been grossly erroneous. One reason is the impossibility of estimating the effect of technology in finding and recovery, or the effect of changes in economic conditions or governmental policy and action.

In order to avoid speculation as to the quantities of commercially recoverable petroleum that will eventually be found in the United States or will be available at some future date, the petroleum industry deals with "known" or "proved" reserves, taking into account only the supply proved to exist by wells already drilled. Moreover, the estimates are based on the quantity considered to be recoverable under economic and operating conditions existing at the time the estimate is made, with not a barrel added to represent an increase that would certainly take place as the result of higher prices or improved technology in finding and producing. For many years, the estimates

---

percentages of energy realized, inasmuch as the amount of energy obtained depends on the efficiency of utilization.

[11] *Basic Data*, pp. 153, 156; *Fuel Reserves of the United States* (1951), p. 9. The latter is a statement prepared by the United States Geological Survey for the Committee on Interior and Insular Affairs (United States Senate) in connection with S. Res. 239 (81st Cong.). It was printed by the government in booklet form for the Committee, and contains valuable information concerning fuel reserves and the methods of calculation. See discussion by Dr. Eugene Ayres and Charles A Scarlott, *Energy Sources—The Wealth of the World* (New York, 1952), Chap. 4, and Zimmermann, *op cit.* note 3, p. 461.

[12] *Basic Data*, p. 76.

of proved reserves of petroleum have been conservative.[13]

Proved reserves of natural gas have been steadily going up. On January 1, 1951, the figure was 186 trillion cubic feet. The net production of natural gas for 1950 was about 7 trillion cubic feet, being approximately 1/26 of the proved reserves.[14] The American Petroleum Institute and the American Gas Association released about March 10, 1952 the reserves of gas and liquid hydrocarbons as of January 1, 1952. The gas reserves were almost 194 trillion cubic feet, an increase of about 8 trillion cubic feet over the figure for December 31, 1950, though the net production in 1951 was about 8 trillion cubic feet.

Proved reserves of oil (including liquid hydrocarbons extractable from natural gas) on January 1, 1951 were approximately 30 billion barrels (barrels of 42 U. S. gallons), while the production for 1950 was about 2,170,000,000 barrels, or about one-fifteenth of the proved reserves. At the same time, reserves of all liquid hydrocarbons at the end of the year exceeded by about 1,160,000,000 barrels the figure for the beginning of 1950.[15]

The estimate of reserves as of January 1, 1952, released by the American Petroleum Institute and the American Gas Association, is approximately 32,200,000,000 barrels, an increase of more than 2,600,000,000 over the reserves of about 29,600,000,000 on January 1, 1951, though the production for 1951 was about 2,500,000,000 barrels. If there had not been a shortage of pipe and other steel items, caused by the defense program, the reserve figure might have been higher.

While production of oil (including liquid hydrocarbons from natural gas) has shown an upward trend, so have the figures of proved reserves. For a long period the reserves have been maintained at a level approximating fourteen times the annual production. For the period 1938–51, for every barrel of oil produced, about 1½ barrels of new reserves were established.[16]

There appears to be no clear indication that a shortage of oil will occur in the near future; however, although the total amount of new oil or reserves has continued to increase, little comfort is found in knowing that for the last ten years the proportion of large new discoveries has declined, or in knowing that informed persons can assign plausible grounds for predicting that domestic production by 1960 may not be large enough to supply the domestic demand unless the trend of large discoveries moves upward or something else happens to add materially to productive capacity.[17]

We do know that more than a billion acres of sedimentary deposits in the United States, including large areas of the continental shelf off our shores, are suitable for the accumulation of oil that could be produced at reasonable cost.[18]

---

[13] *Fuel Reserves of the United States,* p. 16. For a general discussion of petroleum reserves, with tables, charts, etc., see Stuart E. Buckley (Ed.), *Petroleum Conservation* (Dallas, 1951), pp. 15–29.

[14] Report of Hearings on March 7 and 8, 1951, before the Committee on Interior and Insular Affairs, United States Senate, 82d Cong., 1st sess., pursuant to S. Res. 239 (81st Cong.), pp. 128, 132. The report of the hearings will hereafter be referred to by the short title, Hearings on S Res. 239 (1951). *Gas Facts* (American Gas Association, 1951), pp. 14, 17, 46.

[15] Hearings on S. Res. 239 (1951), p. 121.

[16] Hearings on S. Res. 239 (1951), pp. 110, 20.

[17] Eugene Ayres, "Synthetic Liquid Fuels—When and How?" *Petroleum Processing,* Jan. 1951, pp. 41, 42; Eugene Ayres and Charles A. Scarlott, *Energy Sources—The Wealth of the World* (New York, 1952), pp. 29, 38, 40.

[18] Wallace E. Pratt and Dorothy Good (Eds.), *World Geography of Petroleum* (Princeton, 1950), p. 21.

Enormous areas remain to be tested. The search for, and the finding of, new reserves continue. Experience indicates that the relation of production to reserves will not soon materially worsen if the economic incentive justifies the risks involved.[19]

Hydroelectricity

Hydroelectricity, though not a mineral fuel, is an important energy resource that competes with mineral fuels, and may therefore be considered in this discussion.

Electric plants contributing to the public supply in 1950 produced over 329 billion kilowatt-hours, compared with 40 billion in 1920, 91 billion in 1930, and 142 billion in 1940.[20] One estimate for 1951 is 372 billion kilowatt-hours, or more than twice that of 1941 or 1942.[21] Production by industrial producers, not contributing to the public supply, is much smaller and has not materially increased for some years.

Our present reserve of electricity may be considered as being composed of (*a*) the excess of generating capacity and (*b*) potential hydroelectric power. A witness at a recent hearing before a committee of the United States Senate testified that hydroelectric power could be increased about four times that now developed, or to 390 billion kilowatt-hours, and about 75 per cent of such potential power could be considered as economically feasible, and therefore a reserve.[22]

The supply of electric energy can be increased to almost any desired figure by additional plants, if all sources of power are used. Moreover, news items indicate the likelihood that atomic energy may soon furnish heat in connection with the generation of electricity. Such a development might have tremendous influence upon the supply and price of electric energy, with far-reaching effect upon the use and reserves of mineral fuels.

MEANING OF CONSERVATION

Because of space limitations, this paper has been restricted to a discussion of conservation with respect to production of mineral fuels, treating only incidentally, if at all, conservation applicable to transportation, processing, or consumption.[23]

Conservation is here used, as in many oil and gas conservation statutes, to mean the prevention of waste; and waste means reasonably avoidable loss, primarily in the production process, of a commodity that has economic value. Conservation as here used does not include hoarding. Waste with respect to mineral fuels may take place aboveground, as by permitting a gas well to blow into the air, or underground, as by failing to use economically justifiable practices that would increase the ultimate recovery of the fuel.

In determining whether waste exists, or whether additional conservation measures should be employed, prices and other economic considerations are important factors. Waste does not take place merely because a mineral fuel is lost or is not made available for use, or because maximum ultimate recovery will not be obtained by the production methods that are employed. For instance, on the average only about 50 per cent of the coal that is mined is recovered in a form suitable for marketing. The other 50 per cent is usually left in the mine, partly because the cost of preparing it for market would be greater than its value. The term "waste" should not necessarily apply to that loss.

---

[19] *Fuel Reserves of the United States* (1951), p. 35; Committee on Oil and Gas Availability, *op. cit.* note 5.

[20] *Basic Data,* pp. 94–95; Hearings on S. Res. 239 (1951), p. 88; Edison Electric Institute Booklet, *I Want to Know About the Electric Industry* (New York, 1951–52 ed.), p. 5.

[21] Edison Electric Institute Booklet, p. 5.

[22] Hearings on S. Res. 239 (1951), p 83.

[23] For a discussion of such subjects, see Ayres and Scarlott, *op. cit.* note 17, c. 10, p. 128; Zimmermann, *op. cit.* note 3, c. 49, p. 799.

Although modern practices in oil production are considered to be efficient, a large fraction, averaging at least 30 per cent, of the oil in place is not recovered, and cannot be recovered economically by any known method. The oil-bearing rocks (often called sands) are not commonly found at shallow depths. The producing formations in a great many fields are more than 5,000 feet below the surface. Many are more than 10,000 feet deep. Considerable recovery of the oil left in the rocks could be had if the overburden were removed, say to the average depth of one mile, and the rocks were crushed, heated, and subjected to various processes to extract the oil contained in the pores of the rocks. Obviously, the cost of recovering a barrel of oil by such a method would be an incredibly large figure when compared with the value of the oil obtained. Increased recovery is physically possible but not economically feasible.

Clearly, conservation does not require that the maximum quantity of mineral fuels must be produced or recovered regardless of costs or economic values, or that production should be deferred because it may be possible far in the future to recover a greater portion of the fuel in place. Though private owners of mineral fuels, or at least petroleum, may properly be required by governmental regulation to operate so as to prevent reasonably avoidable loss of the fuel, they should not be expected, much less required, to operate without profit to produce or recover the maximum amount, regardless of expense. As well say that conservation requires that the waters of the Mississippi, instead of being permitted to flow into the Gulf of Mexico, should be transported to irrigate some of the arid or semiarid regions of the country, or should be stored for use in future years, whatever the cost may be when compared with the benefits.

CONSERVATION OF COAL

Conservation in the production of coal has made great progress. The continuous improvement in mechanization and mining technique has not only resulted in better products, but has reduced costs, permitting a higher recovery at a cost commensurate with the economic value of the coal recovered. These benefits have been offset in part by the practice of by-passing areas where the recovery does not justify the use of expensive machines.[24] Of more significance may be a process of production already developed that probably will be employed when economic conditions justify its commercial use. It is called underground gasification of coal, and will permit a recovery or use of more than 50 per cent of the coal employed in the process. There is clearly a trend toward a further decrease in the loss of coal, whether or not the term "waste" may fairly be used to describe the loss.

CONSERVATION OF NATURAL GAS

For many years, great quantities of natural gas were vented or lost, especially gas unavoidably produced with oil, called casing-head gas or oil-well gas to distinguish it from gas from wells producing gas only. "Natural gas" is a term that embraces oil-well gas and also gas from wells that produce no oil.

Part or all of the oil-well gas may be dissolved in the oil in the reservoir. Such gas reduces viscosity so that the oil will move more easily to the producing well. Furthermore, the expansion of gas dissolved in oil, and of any gas associated with oil but not in solution, serves in many fields to move the oil. Frequently, some of it is used as fuel for operations or is sold for local use. It follows that gas unavoidably produced with oil, if not at an excessive ratio, performs a valuable function in the production of oil, and for carrying on operations, though most of the gas is dissipated at the surface. Gas produced in excess of a reasonable ratio does not perform its maximum function in aiding production.

---

[24] Ayres and Scarlott, *op. cit.* note 17, p. 60.

For a long time there was no market or use, or any reasonable prospect of a market or use, for much of the oil-well gas after it had been produced, especially in the Southwest; consequently, operators often faced the choice either (*a*) of producing the oil with the aid of solution and associated gas, though most of the gas produced was lost, or (*b*) of shutting in the oil wells to avoid the loss of the gas that would be produced but could not be used or marketed.[25] It is reasonable to say that in most instances the operators were not acting arbitrarily and imprudently by failing to shut down their oil wells, though most or all of the oil-well gas escaped into the air.

At the present, the loss of gas from gas pools is virtually unknown. While a considerable quantity of oil-well gas is lost, the quantity that could with prudence be saved or used is relatively small. Most of the gas that is now lost has no market value at the well. It would not be saved or utilized even if it were given away to anyone who would take it. The gas may contain large quantities of deleterious substances like hydrogen sulphide, or the quantity may be small, or the cost of transporting it to available market may be prohibitive. Many of the new oil fields are far from gas pipelines or markets, and, until a reasonable amount of development has taken place so that the quantity of gas available can be estimated with fair accuracy, sound plans for constructing pipelines and marketing the gas cannot be made. Moreover, it takes time to obtain materials and construct lines. In the meantime, at least part of the oil-well gas is lost. These are some of the many factors that must be considered in determining whether the loss of oil-well gas may fairly be called a waste of such gas.[26]

Operators and officials of state regulatory agencies are fully cognizant of the evil of wasting natural gas, and its loss has already been reduced to a figure that ten or even five years ago would have been regarded as a fanciful one. More remains to be done, and is being done, but the facts do not warrant the statement that tremendous quantities of natural gas are now being dissipated that could be utilized without imposing an unreasonable burden on the operators—a burden not justified by law.

CONSERVATION OF OIL

The history of the conservation of oil need only be briefly sketched here, for it has been told in detail in many books and articles.[27]

---

[25] Stuart E. Buckley (Ed.), *op. cit.* note 13, p. 32.

[26] *Ibid.*, p. 33; Robert E. Hardwicke, "Texas, 1938–1948," in *Conservation of Oil and Gas, A Legal History—1948* (Chicago, 1948), p. 482. The conservation agency in Texas several years ago ordered that the oil wells in a number of fields be shut down until measures were taken to prevent the loss of gas. The orders were based on the finding that waste was occurring because it was economically feasible to prevent the loss of the gas. Robert E. Hardwicke, "Unitization Statutes: Voluntary Action or Compulsion," 24 *Rocky Mt. L. Rev.* (Boulder, Dec. 1951), p. 39. Orders of the Texas agency made in March 1952 will further reduce the loss of oil-well gas produced in a number of West Texas fields. The agency has announced that it will use all its power to minimize the waste of gas.

Serious attention to waste in the production of oil and gas did not become general until about 1930, when the domestic production of oil, plus imports, brought the stocks in storage of oil and products to an all-time peak, wholly out of line with needs. Tested by our knowledge of today, which should not however be imputed generally to members of the industry in 1930, the production practices then in use caused great waste of oil and gas, aboveground and underground.

The overproduction was largely caused by the nature of petroleum and by the manner in which it was produced under laws applicable to the rights of the landowner, usually called lessor, and the duty of the operator, usually called lessee. Oil and gas in the underground reservoir are under pressure, sometimes very great. When a well is producing, there is a reduction of pressure in the reservoir around the bottom of the well. This creates a pressure differential, causing oil and gas in the reservoir to move toward the bottom of the well, being the point of lower pressure, paying no attention to boundary lines in the migration. Oil and gas are then brought to the surface, either by the pressure available in the reservoir or by energy supplied by artificial means, as by pumps.

Prior to regulation under conservation statutes, the influence of the law of oil and gas on waste and overproduction was far-reaching. Under the typical document or lease executed by the landowner to authorize drilling and producing operations, the lessee was obligated to drill wells and operate them in a manner to produce as much oil as possible from the leased tract, draining oil from neighboring tracts if he could, and protecting against drainage of oil from the leased tract to wells on neighboring tracts. It was inevitable that as a rule each lessee-operator drilled wells as fast as he could, and produced them to capacity. Failure of a lessee to drill and produce wells with reasonable diligence, or to act prudently in preventing reasonably avoidable adverse drainage, made the lessee liable to his lessor for the resulting damages, and in some instances caused a termination of the lessee's rights. Such a situation necessarily resulted in a maximum rate of production from all wells, with no regard for dissipation of gas, the pulling in of water, or the needs of the market. Indeed, until the early 1930's, most oilmen thought that they were conducting operations in accordance with sound engineering principles. We now know that this was not true.

The situation became so serious in the late 1920's that state and federal officials, as well as members of the petroleum industry, sought adequate remedies. For various reasons not necessary to relate, agreements among operators offered no solution; and governmental regulation therefore appeared to be necessary. Lawyers expressed doubt as to the legality of federal regulation, but generally agreed that state statutes providing for prevention of waste would be upheld; consequently, the oilmen who talked about great waste being caused by unrestrained production were listened to more attentively. Leaders of the industry turned to the states for help in 1930, encouraging the enforcement of conservation statutes already in the books in several states, and recommending the passage and enforcement of statutes in other states.

---

[27] These books contain much information, and nearly all of them are replete with citations and references to other material: *Legal History of Conservation of Oil and Gas, A Symposium* (Chicago, 1939); Blakely M. Murphy (Ed.), *Conservation of Oil and Gas, A Legal History—1948* (Chicago, 1948); Robert E. Hardwicke, *Antitrust Laws, et al. v Unit Operation of Oil or Gas Pools* (New York, 1948); Engineering Committee of Interstate Oil Compact Commission, *Oil and Gas Production* (Oklahoma City, 1951); Stuart E. Buckley (Ed.), *Petroleum Conservation* (Dallas, 1951). The Compact Commission book is "an introductory guide to production techniques and conservation methods" *Petroleum Conservation* is a definitive exposition of the science of conservation of petroleum. Each is a valuable contribution to the literature of petroleum production and conservation.

Intensive study of the behavior of reservoir fluids was stimulated, and in many forums the subject of waste prevention in oil production was discussed. It soon appeared that sound engineering principles required practices quite different from those prevailing (drill and produce as you please).

State regulation

Regulation that began on a state-wide scale in several states in 1930 was necessarily comprehensive, for the practices of one operator affected another, and when self-help was denied as a method of protecting property rights, law imposed on the regulatory agency an obligation to protect those rights, subject to the reasonable necessities of waste prevention. The oilman was regulated as to the number of wells that he might drill on his property and where they might be located, as to the kind of pipe to use in the well and where he might place it, and as to the amount of oil that he might produce each day and how it should be produced to avoid waste. In many other ways his activities were directed and controlled to prevent waste. Almost never was a well permitted to flow to capacity, and rarely even to pump continuously to capacity unless capacity was very small.

By 1935 a comprehensive program of regulation was reasonably well established, and was generally accepted as being a necessary restriction on the use of private property; but it must not be supposed that in the period 1930–35 vigorous debates and bitter contests as to the legality and necessity of the program did not take place in legislative halls, in the court houses, in the hearing rooms of administrative agencies, and in other forums. It is submitted that no other owners of private property, except perhaps some public carriers, have been subjected to such far-reaching restrictions and control on the use of their property.

It was, of course, inevitable that mistakes were made, especially in the first few years of regulation, but in retrospect it is almost unbelievable that so much progress in waste prevention and in technology of production was accomplished in so short a time. It is also almost incredible that oilmen, long accustomed to drill and produce as they pleased, and to follow practices designed to recover petroleum drained from beneath their neighbors' lands, would seriously urge regulation to prevent waste and to afford each an equal opportunity to produce only the petroleum in his own land or an equal quantity. Even in states where no comprehensive laws have been passed, most of the operators have followed efficient practices that have been developed, but often they were unable to do so because of practices of other operators. Experience has proved that the aid of state regulation is almost always necessary.

It is believed that regulation under state conservation statutes during the last twenty years has resulted in a recovery of perhaps 50 per cent more oil than would have been recovered in the absence of regulation, and has also offered a workable method of protecting property rights. Few realize how necessary is the program to adjust and protect property rights.

Percentage depletion

In determining taxable income, the Internal Revenue Code purports to allow reasonable depreciation or depletion in order to avoid taxation of capital values. With respect to petroleum and other minerals, each barrel or other unit that is recovered is in a very real sense a reduction of capital assets or depletion of the corpus of the property. The amount of depletion cannot be measured on the ordinary basis of capital invested in the property, because such measurement would fail to take into account the large sums risked and lost on nonproductive ventures.

In the early income tax laws, Congress provided for depletion to be measured on the basis of the value of a property after discovery of oil. That method involved many difficult fact questions; consequently, in 1926 the Congress met this situation by adopting a simplified method known as percentage depletion. Section 114(b)(3) of the Internal Revenue Code authorizes a depletion allowance for an oil and gas producing property of 27.5 per cent of the gross income, excluding an amount equal to any rents or royalties paid or incurred in respect of the property, but not to exceed 50 per cent of the net income of the taxpayer (computed without allowance for depletion) from the property; however, in no event may the allowance be less than it would be if computed on the cost and unit-of-production basis.

The provision of the Code, passed in 1926, was designed to provide a reasonable method for determining taxable income and to give an opportunity to replace the capital asset in somewhat similar manner as depreciation does with respect to an ordinary capital asset. The need for, and the reasonableness of, these depletion provisions have been the subject of inquiry many times by committees of the Congress. Each time the Congress has concluded that these provisions are proper and should be continued in effect.

If the depletion allowance were reduced materially, the income taxes on the owners of oil properties would be higher, and their net incomes would be lower; funds previously available for replacing production by further exploration, drilling, and secondary recovery operations would be reduced; there would be less incentive to risk capital in the further search for oil; and the result would be smaller supplies at higher prices. In a tight supply situation, there would be pressure on operators and state agencies to permit production at excessive rates that would cause physical waste. Inefficient practices would reduce ultimate recovery, and conditions would grow progressively worse. The situation briefly outlined is further evidence that economic factors, including taxes, have a direct bearing on conservation.

Saving of manpower and materials

Unquestionably, state conservation statutes and regulations not only prevent or minimize waste of oil and gas, but also the waste of manpower and materials.

Prior to extensive regulation under conservation statutes, operators drilled a large number of wells that would now be called unnecessary wells. Close spacing was ordinarily the rule, for competition required each operator to drill many wells in order to get quickly whatever amount could be produced on his land from wells producing to capacity or virtually so. The advent of regulation under conservation statutes brought control of spacing, wider spacing, and allocation of pool allowables. The incentive, as well as the right, to drill wells that were not reasonably needed to drain each tract was taken away or substantially lessened, and this caused a material reduction in the number of wells that were drilled compared with the number that would have been drilled in the absence of regulation. Doubtless the reduction was more than 50 per cent. Now it is common to drill only one well on each ten, twenty, or forty acres (depending on many factors, such as depth of the producing formation, the porosity and permeability of the rock, the thickness of the productive zone, and the energy available), while prior to regulation one well to each acre or five acres was quite usual. With a decrease in the number of unnecessary wells, there was a corresponding reduction in the use of fittings, equipment, connections, and the like. The saving of manpower and materials has been tremendous.

Although great progress has been made in reducing the number of unnecessary wells, there is still room for improvement. Better information as to reservoir conditions and effective drainage areas, revision of conservation acts in several states, and better administration will accelerate the rate of improvement.

EFFECT OF TECHNOLOGY AND COMPETITION AMONG MINERAL FUELS UPON FUTURE SUPPLIES

It should not be assumed that members of the mineral fuel industries are content with the progress made in preventing waste and in furnishing supplies of fuels at reasonable prices, and are willing to let the future take care of itself. Competition is too keen for the enjoyment of complacency.

Coal

The statistics indicate that coal is losing in its competition with other fuels. Various reasons other than normal competition have been suggested, including the following: (1) most coal is sold in the raw; (2) it is transported by rail, and high freight rates make it difficult for coal to compete with fuels transported by cheaper methods; (3) too often a shortage of cars; (4) transportation of raw coal is the least effective method of transporting energy fuels, transportation of oil by tanker being the most efficient and by pipeline the next; (5) in spite of relatively low mine costs, consumer prices are high because of expensive hauls from mine to market and to ultimate consumer; (6) coal is not as clean or convenient to use as other fuels; and (7) labor troubles are frequent, causing uncertainty or shortage of supply at times when serious consequences may follow.[28]

From a competitive standpoint these handicaps are burdensome, but most of them are not insurmountable. A dynamic policy for the coal industry is now under way. It may shortly reverse the trend in the use of coal.

Consumers of fuels are being wooed to the use of coal by attractive advertising on a national scale, stressing the cheapness and stability of price, the enormous reserves available, the safety in storage and use, and the continuous effort of the coal industry to provide a better product at the lowest possible price.

Better mining equipment is being employed by the coal industry to reduce production costs, and continuous improvement in consuming equipment is giving greater efficiency and convenience, and also reducing costs. Gasification of coal underground has been accomplished in a major-scale development at Gorgas, Alabama, under the joint auspices of the United States Bureau of Mines and the Alabama Power Company. By this process, a large part of the coal in place can be gasified, furnishing a gas suitable for power and with an efficiency greater than that obtainable from present mining methods and the use of coal in steam power plants. The gas may also be used to make oil and gasoline. Moreover, deposits heretofore considered to be of little value can be gasified.[29]

---

[28] Zimmermann, *op. cit.* note 3, pp. 486 and 490, discusses some of the causes of decline in the use of coal. Spot shortages of oil and gas in some areas, and for varying reasons, have also taken place from time to time, so the coal industry is not the only one that can be accused of having spot shortages.

A process is also known, called hydrogenation of coal. It was developed some years ago in Germany, but has been greatly improved by American technologists. The process is used to change coal molecules so that a liquid is formed similar to oil. By distillation of the liquid, gasoline of high octane value, as well as other products, can be produced.[30]

This is not all. The Fischer-Tropsch process can be used to convert coal gas to liquid fuels, from which may be made diesel fuel, gasoline, and other products to compete with products from petroleum.[31]

The Standard Oil Company (New Jersey) and the Pittsburgh Consolidation Coal Company have jointly carried on at great cost extensive research with respect to various methods for the conversion of coal to liquid and gaseous fuels.[32] Similar research has been carried on by other members of the coal and petroleum industries, and by the United States Bureau of Mines. The cost of making liquid fuels from coal is still considerably higher than the cost of making similar products from petroleum, but some progress has been made in narrowing the gap.[33]

One more interesting development should be mentioned. Experiments on a coal-burning gas turbine, sponsored by the Locomotive Development Company at Dunkirk, New York, are far advanced, and may result in a power plant for locomotives that will replace diesel engines and other current types of power.[34]

Enough has been said to make clear that raw coal is now offering vigorous competition to other fuels, with technology playing an important part.

Natural gas

The tremendous increase in transportation and marketing facilities for natural gas in the last ten years has made possible the utilization of much natural gas that previously had been vented and was lost, and has made available to consumers in the northern and eastern portions of the country at relatively low prices a clean fuel that is convenient to use. Natural gas, like coal gas, may be converted by the Fischer-Tropsch gas-synthesis process into hydrocarbon liquids from which can be obtained gasoline and other materials similar to those obtained from oil. A group of oil companies recently completed a gas-synthesis plant at Brownsville, Texas, costing about forty million dollars, having an initial daily capacity of about 7,000 barrels of liquid fuels.[35]

---

[29] *Basic Data,* p. 219; *Business Week,* Feb. 23, 1952, p. 52.

[30] *Ibid.,* p. 217; Ayres and Scarlott, *op. cit.* note 17, p. 104.

[31] *Basic Data,* pp. 216–18; Ayres and Scarlott, *op. cit.* note 17, p. 107.

[32] Hearings on S Res. 239 (1951), p. 96.

[33] Ayres and Scarlott, *op. cit.* note 17, pp. 104 *et seq.* Eugene Ayres, "Synthetic Liquid Fuels—When and How?" *Petroleum Processing,* Jan. 1952, p. 42, says that to earn even nominal interest on investment, the wholesale price of gasoline would have to be at least 18 cents a gallon; and to attract capital, the price would have to be 44 cents higher. Dr. Ayres does not give similar figures for liquids formed by the Fischer-Tropsch process, but does say that the price of products from oil must go considerably higher before the Fischer-Tropsch process will likely be used. George A. Lamb, of the Pittsburgh Consolidation Coal Company, testified that the cost of gasoline made from coal by the hydrogenation process was only 20 per cent higher than the cost of gasoline made from oil. It is not clear whether such things as fair return on investment, taxes, etc. were taken into account. Hearings June 13, 1950, before the Committee on Interior and Insular Affairs (Senate) pursuant to S. Res. 239, S. J. Res. 157, *et al.,* p. 62. A report of a discussion by Paul R. Schultz of the costs of making liquid fuels from oil and from coal appears in *Petroleum Technology* (Feb. 1952) at p. 17.

[34] *Basic Data,* p. 221.

Natural gas is a vigorous competitor for the markets where gas can be used, but the cost of converting natural gas into liquid fuel is still too great to compete very well with liquid fuels from oil.

Oil

It may be no easy task for the petroleum industry to maintain adequate reserves of oil in this country so that a supply of liquid fuels from oil will be available at reasonable prices; however, the indications are that the task will be accomplished, and there will be no shortage for many years. Imports, especially of fuel oils to the east coast, may be relied upon to supplement domestic production, as they have done for years, regardless of any actual shortage in domestic capacity to meet the demand. Time after time, the cry of an imminent prospect of exhaustion or serious shortage of our domestic oil reserves has been heard, but always new reserves have been established, and a reasonable level of prices competitive with those of other fuels has been maintained. It is significant that in 1925 the retail price of gasoline, exclusive of tax averaging 2 cents, in fifty representative cities was 20 cents a gallon, which was also the price in 1950, exclusive of state and federal taxes of about 6½ cents.[36] Moreover, a gallon of gasoline today does 50 per cent more work than it did twenty-five years ago, thus in effect decreasing the price and increasing the reserves.

The petroleum industry is now spending more than one hundred million dollars a year on research. Who knows what tomorrow will bring in the science of finding new reserves? Perhaps something more spectacular than the geophysical methods which were developed only a few years ago.

Max Ball has told in a few words what could be stretched into a long story: "The more [oil] we find, the less there is remaining to be found; but the more we find, the more we learn to find more."[37]

In the early days of the petroleum industry, surface indications, such as oil seeps or gas bubbles, influenced the drilling of wells in search for oil. About 1900, the theory was advanced that anticlines or domal-shaped formations were ideal for the accumulation of petroleum. The theory was sound, being proved in many instances, and in a spectacular manner in 1901 when the Lucas Well at Spindletop Hill, near Beaumont, Texas, came in with a roar heard for a mile, gushing great quantities of oil all over the countryside. Spindletop Hill got its name because the area was a low hill in the coastal plane.

We now know that the hill or slight elevation resulted from great forces causing the movement far underground of a large salt mass existing in a plastic form or a fluid. The salt mass exerted terrific pressure, causing fractures in a part of the overlying formation. The salt flowed into one of the larger fractures or weak places, becoming what is known as a salt plug. This plug, like a gigantic bullet, was forced upward by what might be called hydraulic pressure, moving a considerable distance. This force bent upward formations nearer the surface; and a dome was created, easily recognized in the coastal plane. The search for other salt domes became the aim of the oilman in the Gulf coast, and many fields were found; but before long few visible domes were left to drill, and prophecies were freely made as late as 1920 that no more oil fields would be found in the Gulf coast. These were reasonable prophecies if the dome-shaped formations could not be located without surface indications. The prophets failed to reckon, however, with technology.

---

[35] *Basic Data*, p. 216; Hearings on S. Res. 239 (1951), pp. 95–96.

[36] American Petroleum Institute, *Petroleum Facts and Figures* (New York, 9th ed 1950), p. 379. Similar information for 1950 and 1951 is not available.

[37] Hearings on S. Res. 239 (1951), p. 69.

The arts of the geologist and the geophysicist make possible the location in the Gulf coast of many domes and other traps or conditions suitable for the accumulation of oil and gas, without the aid of surface indications. The proof is this: 33 billion barrels of oil have been discovered in the Gulf coast since 1920, and, of this amount, geology and geophysics were responsible for about 75 per cent of the discoveries. More than 8 billion barrels have been discovered in the coastal area in the last decade, of which 99.5 per cent is attributable to geology and geophysics.[38]

A show of oil was found in West Texas in 1944 and again in 1947, in a formation that is now commonly called the Spraberry formation, or trend. Several pools were indicated by wells completed in 1949, especially in the Midland area where the sand series had vertical fractures that provided the main drainage channels. However, the likelihood of producing from the low-quality Spraberry formation at a profit was so slight that few were willing to take the risk until the latter part of 1950. A higher price level for oil, relatively wide spacing, faster and cheaper drilling, good reservoir engineering, plus the use of the "hydrafrac" method, were some of the factors that stimulated operations and the hope of profit. Now the Spraberry trend involves some two million acres extending through ten counties, with a proved reserve of one billion or more barrels of oil, and great quantities of gas. The "hydrafrac" method, as improved by one of the oil companies, not only employs "hydraulic" pressure to cause fracturing, to increase the size of old fractures, and to effect communication between fractures, but it also forces into the fractures sand grains, called propping agents, to keep the openings from closing. It is plain that technology was largely responsible for establishing a great reserve of oil and gas.[39]

In recent months, the Richey area in Montana and the Williston Basin in North Dakota, far from any oil fields, have been proved to be productive. Extensive drilling has not yet taken place, so the probable sizes of the reserves have not been indicated; but the prospects must be favorable, for millions of acres are being leased, and an active drilling campaign is under way.

These typical incidents of additions

---

[38] Carl E. Reistle, Jr., "The Importance of Technology in Oil Production," *Petroleum Engineer,* Drilling and Producing ed., Dec. 1951, p. A-40.

[39] Two companies are now experimenting with unorthodox drilling procedures to increase production. One company, by directional drilling or slanting the hole at a considerable angle, anticipates that a larger number of the vertical fractures will be connected than would be by drilling a vertical hole. Another company drills several short, almost lateral, holes off the main well bore in the pay zone, in order to increase the drainage area by cutting into more fractures. *Oil and Gas Journal,* Feb. 4, 1952, p. 37. A recent newspaper dispatch says that research is now going on at the University of Texas to increase ultimate recovery of oil, especially from depleted pools, by the use of soap or detergents The results may be gratifying to the company advertising that "Duz does everything"

to reserves illustrate the truth of the statement by Max Ball; they show why there is hesitancy among informed oilmen, even after test wells are drilled, to condemn an area as being nonproductive or to make positive estimates as to potential reserves.

The effect of developments in exploration, drilling, and production technology leading to finding more oil and increasing recovery at lower cost has been told by Carl E. Reistle, Jr. in the interesting paper, "The Importance of Technology in Developing Oil Production." Reistle's sketch of the amazing technological progress warrants the belief that for a long time the domestic reserves of petroleum will be adequate.[40]

Enormous quantities of petroleum oil, conservatively estimated to be from 7 to 10 billion barrels, remain to be produced by secondary recovery methods from depleted and semidepleted pools[41] when it is economically feasible to undertake the operations. The astounding growth in the number of projects and in technology in eight years is evidenced by the two editions of the book, *Secondary Recovery of Oil in the United States,* the first in 1942 (259 pages), the second in 1950 (838 pages).

Many additional prolific deposits of petroleum are almost certain to be found in the continental shelf, often called tidelands. Already a number of fields have been discovered off the shores of California, Louisiana, and Texas. In spite of wind, wave, and hurricane, wells have been drilled and produced in the Gulf of Mexico some twenty-five miles from land in water nearly fifty feet deep.[42] The ingenuity of the oilman in conducting successful offshore operations at expense that seems to be justified approaches the incredible. It is certain that further drilling in the offshore areas will result in finding new pools.

This is what the United States Geological Survey said in 1951 about the ability of the industry to maintain adequate petroleum reserves:

> No precise statement as to the amount of potential reserves of oil and gas in the United States can yet be made. If the future can be judged by the past, oil and gas will be found in sufficient quantities for many years to come. In the United States adequate production has been a direct function of economic incentive. Until the unpredictable date at which that incentive fails to provide the needed supplies, there will be no convincing evidence that we have reached the limits of our ability to expand the potential ultimately recoverable reserves of petroleum.[43]

Leaders in the petroleum industry agree with that statement;[44] however, they have no intention whatever of being unprepared if a shortage of petroleum is indicated. They observe that the essential business of the industry is that of supplying liquid and gaseous fuels to the public, and the industry will turn to an alternate source of raw materials, if that be necessary to stay in business.[45] To a great extent, the time and direction of the shift will be controlled by economic factors. The raw material may be coal or natural gas, but more likely it will first be oil shale.

---

[40] Reistle, Jr, *op. cit.* note 38. A new record for fast drilling was recently set in Louisiana, when the crew in eight hours drilled 2,575 feet, or one-half mile. Such efficiency of tools and men illustrates the astounding accomplishments of the industry in doing a better job and reducing costs. Research with the aim of developing better methods of finding and producing oil and gas has been continuous for years.

[41] Committee of American Petroleum Institute, *Secondary Recovery of Oil in the United States* (New York, 2d ed., 1950), p. 31, and many papers cited therein; Ayres and Scarlott, *op. cit.* note 17, p. 44. Lt. Gen. Ernest O. Thompson, member of the Railroad Commission of Texas, the agency administering conservation statutes, in an address before the American Petroleum Institute in Nov. 1951, said that the possible recovery might be as high as 75 billion barrels

[42] Robert E. Hardwicke, "The Tidelands and Oil," *Atlantic Monthly,* June 1949, p. 21; "Offshore Drilling Symposium," *Oil and Gas Journal,* Feb. 23, 1950, pp. 135–54.

[43] *Fuel Reserves of the United States,* p. 35.

[44] Repeated statements of such import appear in Hearings on S. Res. 239 (1951), in the Proceedings of the 28th and 31st Annual Meetings of the American Petroleum Institute, and elsewhere. Especially interesting is *Petroleum Productive Capacity, op. cit.* note 5. It is a valuable contribution to the literature of petroleum.

Oil shale and bitumens

The known supply of oil shale in the United States is enormous. Especially large and rich deposits exist in Colorado, Utah, and Wyoming. Oil shale contains solid organic matter, part of which can be converted by distillation into oil and combustible gas. Conservative estimates place the recoverable oil content at 500 billion barrels from known deposits. The problem has been to make the recovery economically feasible. The United States Bureau of Mines and units in the petroleum industry, separately and co-operatively, have for a number of years carried on research and operated pilot plants in an effort to obtain oil, gas, and products from oil shale that could be marketed in competition with petroleum and its products. A large-scale operation is now being conducted near Rifle, Colorado, with considerable improvement in the efficiency of operations. The indications are that in time oil from shale will enter into the vigorous competitive contest now going on among mineral fuels.[46] Many factors will bear upon the time when and the extent to which oil shale will supply liquid and gaseous fuels.

Scattered throughout the United States are bituminous rocks and asphaltic deposits from which liquid fuel may be obtained, though at much higher cost than from petroleum. A recovery of more than a billion barrels of oil is esimated as being possible from known deposits in Utah, Texas, and California.[47]

IMPORTANCE OF TECHNOLOGY AND FREEDOM OF INITIATIVE

Whatever may be the facts with respect to reserves in the United States of raw materials suitable for mineral fuels, there are physical limits imposed by nature. The total numbers of tons of coal and barrels of oil in place are fixed, but the total numbers of available tons and barrels can be greatly increased, being stretched or multiplied by factors that virtually have no limits, such as technology and freedom of initiative.

Substantially the same idea was expressed by the United States Geological Survey in concluding its statement as to the fuel resources in the United States as follows:

> Only in appraisal of the basic geologic data and in the conception and application of new modes of discovery thinking and new techniques of discovery does the geologist have a large share of responsibility. For the fuels as for many other minerals, the other technologic and economic factors have at least an equally significant part in determining our Nation's future ability to supply itself and its citizens with the heat, light, and power requirements needful for our defense and continued progress to higher levels of civilization.[48]

---

[45] Hearings on S. Res. 239 (1951), pp. 96–99. Even if liquid and gaseous fuels are made synthetically, the petroleum industry can use much of its present facilities and organization.

[46] *Fuel Reserves of the United States,* pp. 35–38; *Basic Data,* pp. 169–71; Hearings on S. Res. 239 (1951), pp. 96–99; Clyde Berg, "Oil Shale as a Fuel Reserve," *Petroleum Engineer,* Drilling and Producing ed., Jan. 1952, p. A-37.

[47] *Fuel Reserves of the United States,* p. 38.

[48] *Fuel Reserves of the United States,* p. 40. To the same effect, J. Frederic Dewhurst (Ed.), *op. cit.* note 7, p. 577.

Our energy-resource industries have performed near miracles under a social and political system that encouraged individual initiative and competition, subject to state conservation laws and to antitrust and similar laws. The wording of S. Res. 239 (81st Cong., 1950) may carry the implication that a new system or national policy should be adopted. Surely the need to discard the existing system or policy for a new one has not been proved. During the hearings held in March 1951, pursuant to the Senate Resolution, members of the competitive energy-resource industries who participated in the discussions expressed satisfaction with the existing system, and they opposed any change that contemplated comprehensive federal regulation, or even payment of subsidies, or allocation of markets for fuels, or control of end use, as a means of assisting any fuel in competing with other fuels.

In the round-table discussion reported in *Basic Elements of a Free, Dynamic Society,* Dr. Frank Tannenbaum, professor of Latin American history at Columbia University, and Peter F. Drucker, author and consultant on management organization, went further. They even opposed pretentious planning by government. Dr. Tannenbaum said:

> Now, second, the things that have happened in America unexpectedly, unplanned, have happened, I think, partly because we don't make great plans. We make little plans. We make no plans at all. That is, we are inclined to cross the bridge when we get to it. We don't attempt to harness the future. And I should be very sorry to see any such attempt projected.[49]

Mr. Drucker put it this way:

> My second point is, we made very clear that we are not a planned society. . . . Planning presupposes infallibility, and we don't believe in that. Yet we certainly do not want to create the impression that what has happened in the United States "just happened." Somebody made it happen. We are all agreed that what has happened came about because of the existence of conflict—because we accepted conflict and tried to utilize it, to turn it to account rather than to suppress it into the harmony of the graveyard, which is the social scientist's paradise, called "adjustment."[50]

No one participating in the round-table discussion disagreed with the ideas expressed in the quotations.

Competition, individual initiative, technology, and ingenuity may be compressed into the words "man's resourcefulness." If a national policy for the mineral fuels and hydroelectric power, or for all energy resources, does not exist and must be made, and be in the interest of the whole people rather than the interest of any fuel, then the following quotation contains observations that should control:

> Our greatest resource is man's resourcefulness, encouraged by appropriate incentives and expressed in the progressive march of technology. It is the fundamental resource, and it is unmeasurable for the future. We only know that it can be encouraged or discouraged. Competition and freedom of individual initiative, together with rewards that are comparable with the risks assumed, are the driving forces behind such technological progress. Subsidies of one form or another, efforts to direct the use of particular forms of energy into specified channels, and other such devices have always had disappointing results in the long run. If used in the future, they will again fan the hot dry winds of discouragement to aggressive and competitive progress.
>
> Technology has grown and flourished in comparatively free and unencumbered climates. *Any discouragement of the progress of technology, the real resource for the*

---

[49] *Basic Elements of a Free, Dynamic Society, op. cit* note 9, p. 18.

[50] *Ibid.,* pp. 73–74.

future, might make a forecast of future availability prove to be more accurate, but this surely is a poor substitute for the abundance of all energy resources which the national interest requires. Artificial interference with the normal development of the energy resources of the future could only assure the realization of the lower limits of availabilities that are predictable on the basis of known technology.

In the free society, man will never be short of the energy he needs, for he will never be short of ingenuity.[51]

Indeed, we already have a national policy that conforms to the recommendations inherent in the language just quoted. That policy has been extraordinarily successful. To make any material change, for example by introducing federal control, certainly appears unwarranted under present conditions, and federal control might even be disastrous.

---

[51] The quotation is from an unpublished draft of a report of a subcommittee of the National Petroleum Council. An elaboration of the viewpoint appears in the report, *Petroleum Productive Capacity, op. cit.* note 5.

Robert E. Hardwicke, LL.B., Fort Worth, Texas, is senior partner in the law firm of Hardwicke, Haddaway & Pope, and is part-time lecturer at the School of Law, Southern Methodist University. He has specialized in the law of oil and gas, has served as chairman of the Section of Mineral Law of the American Bar Association and the similar section of the State Bar of Texas, and was associate and chief counsel of the Petroleum Administration for War during World War II. He is author of Petroleum and Natural Gas Bibliography (1937) and Antitrust Laws, et al. v. Unit Operation of Oil or Gas Pools (1948), and of many articles on the law of oil and gas and on conservation published in legal periodicals or as chapters in books.

International Fuel Economy

By Eugene Ayres

TODAY the majority of the earth's population is living in much the same fashion as our primitive ancestors, while the way of life of a minority is beyond comparison. This is not a historical innovation; it has always been so. Each superior people has been justly proud. Each has thrived only a little while. Islands of culture have been submerged by tidal waves of more primitive humanity. But each superior people has made some lasting contribution to progress of mankind, and as the centuries have rolled by, the ratio of highly privileged to underprivileged may have become larger.

The highly privileged are still a minority. Sixty per cent of the earth's population is underfed, and this unhappy majority has a common vital goal in demand for bread. The 40 per cent, of which the United States is a part, is divided by competition for cake.

An important focus of competition today is liquid fuel. We are inclined to boast about our prodigious use of petroleum, but statistics on world versus United States consumption have a familiar ring. They remind us of the seventeenth century when England conceived of "bringing coals to Newcastle" as a description of ultimate futility. Today, as coal is indeed being brought to Newcastle in ever increasing quantities from the shores of America, it is timely to appraise our own circumstances in the light of British economic history. Let us take a brief look at some of the factors of analogy and distinction.

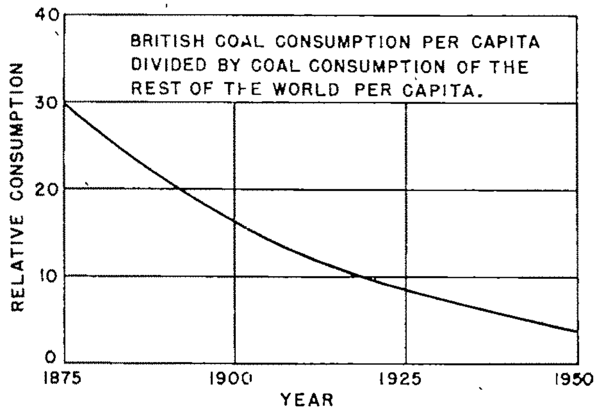
A Pattern of Economic Change

Among the many useful indexes of economic health, one is generally overlooked. This is the trend with time of the ratio of per capita consumption of one country to per capita consumption of the rest of the world. This trend is remarkable because it is almost insensitive to wars, social legislation, business levels, and monetary policies.

In 1875 Britain consumed 30 times as much coal per capita as the rest of the world. The factor has declined smoothly and steadily from that date. In 1900 it was 16; in 1925 it was 8; now it is 4. Most of Britain's production has been for home consumption and for export for use in British ships. Maximum British use in comparison with the rest of the world was probably not much earlier than 1875. This is when British ships were renowned the world over, and Queen Victoria was proclaimed Empress of India; when interest rates were abnormally low, and ratio of exports to imports had begun to fall.

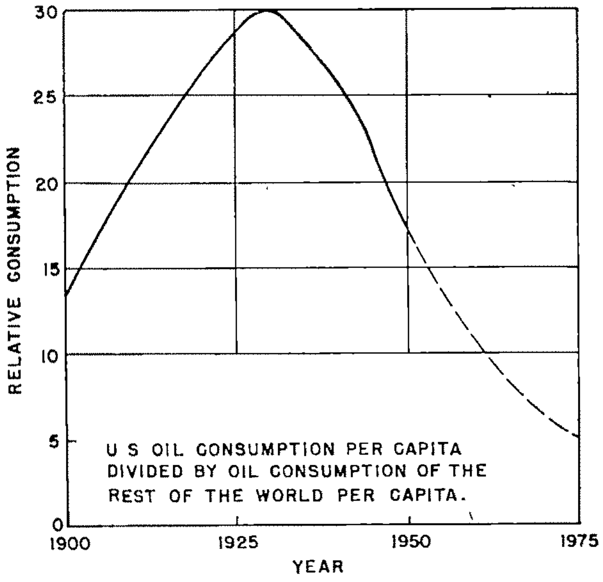
The situation for the United States with regard to oil is similar. In 1910 we consumed 21 times as much oil per capita as the rest of the world. The factor rose until the maximum distortion was reached in 1930 when we consumed 30 times as much as the rest of the world. Since 1930 the factor has become smaller each year. In 1940 it was 26; in 1945 it was 22; now it is 17. No physical or economic factors appear to exist to halt the downward sweep. A good guess for 1975 is that we shall then be consuming per capita about 5 times as much as the rest of the world. It is too early to know whether our peak of relative consumption has been coincident with any other economic trend.

It is obvious that downward trends for Britain and for the United States



mean an upward sweep somewhere else in the world. A trend toward equalization of consumption might represent a trend toward economic world stability. Such a trend would be good for the world and consequently good for the United States—provided we could contrive to make the transition more gracefully than Britain. But it happens that while the most highly industrialized countries are now showing a downward trend, the same thing is also true of areas having the *least* consumption (Middle East, India, Pakistan, and China).

Curves of relative per capita consumption are not concerned with capacity to produce, with absolute per capita consumption, with needs for energy, or with extravagance in use. They are concerned only with relative *capacity for use*. That is why they are so smooth and why they have such fundamental significance. Capacity for use is determined by degree of industrialization, national income, and distribution



of purchasing power; but the trend with time of relative capacity for use is determined by such intangibles as virility, optimism, ingenuity, confidence, and imagination—qualities that are not exclusive to any people, and qualities that are likely to change in degree with the march of time.

NATURE OF RESERVES

The present difficulty with British economy was predicted in 1865 by Stanley Jevons; but no one in Britain then paid much attention to Jevons' warning, for it was clouded by a popular misconception of the nature of reserves —a misconception that is common in the United States today. The most important factor is not the *size* of a reserve but rather the *rate* at which it may be procured. Jevons' idea of the probable optimum rate of procurement seemed unrealistic in the light of the great amounts of minable coal that were presumed to exist under British soil. Today it is believed that during the next century Britain will be able to produce not more than 25 billion tons, and will need twice this amount. Another 25 billion tons may be gradually produced in later centuries. Regardless of technical, social, political, or fiscal events, Britain is confronted with a permanent and growing shortage of domestic energy. For she has almost no petroleum or gas.

Estimates of petroleum reserves in the United States are more realistic. We are producing around two billion barrels a year, and we are virtually sure that 30 billion barrels more are producible. Plausible geologic estimates of 110 billion barrels have been made. But it has been shown that even a reserve of this magnitude does not mean that our domestic production can keep pace with domestic demand. We are already importing substantial amounts, and after 1970 we shall probably have to step up our imports drastically. We are confronted with a permanent and growing shortage of domestic petroleum, but not of energy; for our coal reserves are very large.

Britain's economy has been somewhat dependent upon exports of coal. Our economy is not at all dependent upon exports of petroleum. Britain's coal consumption is still well above world coal consumption—even a little above that of the United States, because so much of our energy comes from oil and gas. But the world is catching up. The economic consequences to Britain are painful because of two independent factors: (1) shrinking relative capacity for use of coal, and (2) insufficiency of production to meet her needs. Of the two, the former has been by far the more important. The second is a recent malady that will soon accentuate her difficulties, because her economy has been inflexibly geared to domestic coal. She has not yet found an economically suitable way of making up thermal deficiencies with imported coal or by substitution of oil from British-owned concessions abroad. One is tempted to believe that national revenues should come from anything other than imports of fuel.

Our economy is tightly geared, in part, to liquid fuel but not to domestic petroleum. We have the fortunate alternatives of importation of petroleum as long as this is possible, and conversion of our abundant coal when imports become inadequate or undependable.

Existence of such alternatives should not make us complacent. Imports of petroleum will be impeded more and more by international competition. For as the world tends to catch up with us in consumption, the rate of world production will begin eventually to decline. We shall then be compelled to use relatively expensive liquid fuel from coal (and oil shale) while some other nations are still using relatively cheap petroleum. It is of the utmost importance to us (1) to import as abundantly as we can while it is still possible, and (2) to avoid unnecessary waste of petroleum. Only thus can we postpone the time when we shall be at a fundamental competitive disadvantage.

MIDDLE EAST

The long-term disadvantage to the United States of incidents like the cessation of Iranian production is not that we must export to make up world deficiency, but rather that we can import less than we need. The fabulous Middle East, of which Iran is a part, has an area nearly as large as the United States and with about one-third our population. Climatic variations are similar to those in the United States, although more of the Middle East is desert, and portions of the country are normally colder. Portions are extremely fertile, but much is arid. The Middle East is believed to be the birthplace of civilization, and has suffered the senseless ravages of civilization for a longer time than any other part of the earth. For example, deforestation has been almost complete, and erosion is widespread. The consumption of wood per capita in Iran is now little more than one-thousandth that in Finland (the most prolific wood user). But the petroleum reserves of the Middle East are believed to be larger than those in the United States—larger, in fact, than in any other known area of the earth. For its petroleum, the world is destined to be dependent upon the Middle East for several decades to come.

Iran is only one of the countries that make up the Middle East. Iran looks unimpressive on a map of Asia, but it is as large as the sum of Texas, Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota—a neat slice out of the center of the United States. The population of Iran is 30 per cent larger than the sum of the population of the above states. Iran has been blessed with petroleum production since 1913, and while most of this production has been for export, Iran has had the opportunity to retain up to her capacity for use. Early statistics are inadequate to determine just when her relative per capita consumption reached its peak, but since 1938 it has been on the way down. In 1938 Iran used (per capita) only about as much petroleum as the rest of the world. In 1947 (before the termination of production) the proportion was about seven-tenths. This makes a curious parallel between Iranian and United States economy. While one is a little below world consumption and the other well above, both are on the way down in a relative sense. This is all the more remarkable in that the *production* of Iran in 1947 was 2.5 times the production in 1938, and royalties to the Iranian government have been proportionate.

Iran cannot be regarded as altogether typical of Middle East countries. Iraq, Saudi Arabia, and Kuwait are all different in various respects. Much favorable comment has been made regarding the special wisdom with which Saudi Arabia has been investing its oil revenues. Kuwait is remarkable because, while it is only about as large as Rhode Island, its oil reserves probably exceed those of Iran. But in spite of differences between component parts, the Middle East as a whole has not yet developed to the point of even average per capita consumption of oil. There may not be time enough. The peak of Middle East production is likely to come only about twenty-five years after the peak of production in the United States. The Middle East countries will continue to export oil until they have no more to export, and the vast royalties they will receive may not be invested in sufficiently productive enterprises to provide adequate future income. Let us hope that the governments and peoples of these countries will be able to take advantage of their significant opportunities.

DISTRIBUTION OF OIL

The Middle East and Russia are believed to divide about equally one-half of the petroleum yet to be produced in the world. Forty per cent is divided about equally between the United States and the rest of the Western Hemisphere. The other 10 per cent is widely scattered. This distribution is based upon somewhat academic estimates of ultimate production—estimates that are related in no way to "proved reserves." They are related even less to production; for about 63 per cent of the world's total oil production so far has come from the United States. Fifteen per cent has come from the rest of the Western Hemisphere. This leaves only 22 per cent for the rest of the world, and only a quarter of this has been produced by the Middle East.

From these figures it is apparent that the Middle East still has a long way to go. Russia has "proved" less than 4 per cent of her presumed ultimate reserves. For this reason, Russian production is likely to come late upon the world stage. Because of vigorous exploration by western nations, the Middle East has about the same proportion of "proved reserves" as the United States (about a fifth of presumed ultimate reserves). The Middle East, therefore, is in a position to contribute promptly to world demands.

Figures of interest are obtained by expressing cumulative production as a percentage of the sum of cumulative production and proved reserves. Such "relative depletion" is 61 per cent for the United States and only 8 per cent for the Middle East. If relative depletion is based on estimated ultimate production instead of proved reserves, it appears that we have produced about a quarter of the oil originally present under United States soil, while the Middle East has produced only 2.5 per cent of its original reserve.

SOME OTHER COUNTRIES

India and Pakistan are examples of countries with substantially no petroleum and very low per capita energy consumption. In 1938 they used 0.05 as much oil as the rest of the world. By 1947 this had fallen to 0.036.

China has always been low in per capita use of fuel, and because of continuous internal strife, her relative coal consumption today is only about a quarter of what it was ten years ago.

Russia is on the way up. She has not yet reached the peak of relative consumption of total energy (coal plus gas plus oil). The curve is still rising rapidly—about 25 per cent per decade—but her relative per capita consumption is not yet above 10 per cent of that of the United States. The United States reached a peak of relative per capita consumption of total energy about 1910, since when we have been slowly receding. We now use (per capita) about 17 times as much coal, oil, and gas as the rest of the world. If present trends continue, Russia's per capita consumption of coal may equal ours in 1960, but she will not then equal us in *total* fuel use.

Canadian consumption of oil (production plus net imports) shows a rising curve. She now uses four times as much per capita as the rest of the world. This is interesting in view of Canada's excellent fiscal position. Yugoslavia is another country on the way up. In 1942 she used per capita only a tenth as much coal as the rest of the world.

Today she is a little above par. Her curve shows a more sensational recent rise than any other.

THE FUTURE

If Middle East oil should not be freely available to us after the peak of oil production has been passed in the United States, we may be at a temporary disadvantage in energy costs; but eventually we shall be in a very fortunate position, for it seems that we have more than half the world's oil shale and about half the coal. The latter is of special importance because energy from oil shale is likely to be only about 3 per cent of energy from coal. We passed one peak of relative coal consumption before 1920. The factor has been going down since then because of our abundant use of oil and gas, but it will rise again to a new peak by the end of this century because of our prospective use of coal not only for liquid fuel but also for the generation of electric power. Our economy is geared even more tightly to electric power than to liquid fuel.

There is every reason to expect our second (and last) peak to be higher than the first. For some decades we shall have an enviable *opportunity* in the possession of ample competitive energy reserves. This does not mean, of course, that we shall take proper advantage of this opportunity. Britain's economy subsided from 1875 in spite of ample energy reserves. The economy of the Middle East is not in a position to take advantage of her present unexampled opportunity in oil reserves. Whether we prosper depends upon the economic ingenuity with which we may compensate for the subsidence of our relative capacity for use.

Back in 1768, Horace Walpole (who made many whimsical mistakes) was strangely impelled to exclaim—"The best sun we have is made of Newcastle coal, and I am determined never to reckon upon any other." Unknowingly, this statement was a counsel of despair; for the Newcastle "sun" is fading, and England has less natural sunlight than most geographical areas. The wealth of the more distant future—beginning, perhaps, a little more than a century hence—will be derived from the sun. When that time comes, the Middle East, which is generously drenched with sunlight, may again become the fountainhead of civilization.

CONCLUSION

The pattern of economic change discussed in this brief article is not easy to interpret. Statistics on world consumption of fuels are spotty and sometimes unreliable. But it is clear that a falling trend of relative per capita consumption in highly industrialized countries cannot be dismissed as a natural consequence of development of "backward" peoples. Unfortunately, peoples who are lowest in use of energy are moving still lower (in a relative sense). In general, improvement is shown in nations that have been partially industrialized and that have rapidly developing capacity for use. The trends will bear watching in the future.

Eugene Ayres, Pittsburgh, Pennsylvania, is technical assistant to the executive vice president of the Gulf Research & Development Company. During the past twenty-five years he has been engaged in the organization and management of petroleum research. He is a member of many petroleum committees, has taken out more than fifty patents, and has written many technical articles. He is co-author of Energy Sources—The Wealth of the World (1952) and has contributed chapters in other books.

Conservation of Hydroelectric Power

By Paul J. Raver

THE development, use, and conservation of energy resources are indispensable to the physical progress of mankind. The high degree of correlation between the per capita use of energy and per capita production of the nations of the world is ample proof of this statement. No country, state, or region in the world today can prosper unless it assures itself of an energy supply which is adequate for current uses, can be expanded for future needs, and is low in cost and will continue to be low in cost in future years.

If men continue to increase their physical standards of living, they must increase their consumption of energy. They require energy for the transportation of people and things, for the modification of the temperatures of their dwellings and other buildings, and to change the form of materials so as to make them more useful. Continued progress in the satisfaction of physical wants means continually greater drafts on the energy sources of the world.

ENERGY SOURCES

Eugene Ayres has divided the energy sources of the world into two major categories which he calls "continuous" and "unrenewable."[1] He includes in his "continuous" sources vegetation, solar heat, water power, wind power, tropical waters, earth heat, tides, and atmospheric electricity. In the "unrenewable" sources of energy he includes the fossil and atomic fuels. Most of our energy sources can be traced to the heat and light given off by the sun at present and in past years.

There is in view today for the United States an adequate supply of energy to meet our foreseeable requirements for many generations. We have learned not only how to recover the energy from our coal and oils, but also how to convert solid into liquid fuels, and how to convert all fuels except atomic energy into electricity. And electric generators powered by atomic energy may be operating soon.

Our principal energy problem for the next few decades will be to keep the cost of energy low enough so that increasing demands will not be frustrated by increases in cost. The easily accessible supplies of energy are the first exploited, and hence the first exhausted. As less accessible supplies are tapped, the cost per unit tends to rise. Offsetting this trend to higher costs have been the continuing improvements in technology. Scientific and mechanical developments have kept the costs of coal, natural gas, petroleum, and electricity relatively low in spite of deeper mines, deeper wells, and more remote hydroelectric sites.

Conservation of hydroelectric power of the United States means the development of all feasible water power sites for maximum power and energy production. Such development should, of course, be consistent with other uses of our resources. The opposite of conservation in this respect is failure to develop and use our water power resources, or development of only part of the potential of our power sites.

The flow of water in our streams is constantly being renewed by the processes of evaporation and condensation and the phenomena of snow and rain. The power of the falling water in our streams is thus considered to be "continuous." If it is not used for power generation, however, it is wasted beyond recovery. Like time, it flows on forever; but once the flow has passed, it is lost forever.

---

[1] Eugene Ayres, "Major Sources of Energy," a paper presented before the 28th Annual Meeting of the American Petroleum Institute, Chicago, November 9, 1948.

COMPARATIVE DEVELOPMENT OF WATER POWER

Although water power was the preferred source of industrial energy when manufacturing began in the United States, it has lagged far behind. Out of 432 billion kilowatt-hours generated in 1951 by industrial and utility plants, only 102 billion were generated by water power. Of the 330 billion kw.-hrs. generated by thermal plants, steam turbines produced all but about 7 billion, which were produced by internal combustion engines, mostly diesel engines.

If all of the undeveloped hydroelectric sites in the United States had been developed and in use, total generation by water power alone could have exceeded the total 1951 electric output in the United States. In terms of capacity, about 18 per cent of the total United States water power potential had been developed by January 1, 1952. It is estimated that this capacity was capable of producing approximately 20 per cent of the total United States hydroelectric energy potential.

By January 1, 1952 there were under construction or authorized for construction projects with a potential capacity of 18 million kilowatts capable of producing 85 billion kw.-hrs. in an average water year. Of this, 7.7 million kw. were located in the Pacific Northwest, where projects with a potential capacity of 34 million kw. still awaited development in 1950.

For a variety of reasons, it will not be possible to develop *all* of America's water power potential in the foreseeable future. Cost of construction and land at some sites will be too expensive for the power output to compete with other methods of generating electricity. Development of other sites is likely to be prevented by pressure groups, representing vested interests such as railroads, fisheries, privately owned utilities, national park enthusiasts, miners, port commissions, and landowners. Some potential water power sites may never be developed because of these factors.

On the other hand, if the people of the United States were convinced of the importance of conserving our water power, the development of 65 to 75 per cent of our total water power resources could be completed in the next twenty-five to fifty years.

ADVANTAGES OF PUBLIC DEVELOPMENT

If America's hydroelectric resources are to be conserved by developing her river basins, the government will have to assume the major responsibility. By and large, the feasible single-purpose hydroelectric sites, suitable for development by private investors, have already been pre-empted and developed. By 1930, privately owned electric utilities had installed about 8 million kilowatts of hydroelectric capacity. By 1950 this had increased only to 9 million kw., and in 1951 only 140,000 kw. was added. Private investment in hydroelectric sites is currently increasing because of the ability of private companies to obtain rapid amortization under the defense laws, which in effect have reduced the investment required for hydroelectric development; but even with this advantage, the number of feasible single-purpose sites is too limited to sustain a permanently higher level of private investment.

Public development of river basins for all their values, including—in addition to power—flood control, irrigation, soil conservation, navigation, recreation, maintenance of fish and wildlife, pollution abatement, and municipal and industrial water supply, makes possible the proration of the cost of facilities common to power and other functions, thus reducing the cost to be borne by power.

On the other hand, by paying its share of the cost of such joint facilities, hydroelectric power may bring down the cost of navigation or irrigation or any other river function, and thus make it possible for the public to enjoy the benefits of such developments. These are public functions, and can be achieved only by public development of river basins on a comprehensive basis.

The key to these aspects of water conservation is the storage reservoir which holds back floodwaters for release during periods of low river flows for the generation of power, the irrigation of land, the maintenance of adequate river depths for navigation, the abatement of pollution, the restoration of oxygen to the streams to permit fish to live, and the provision of municipal and industrial water supplies. But such reservoirs will seldom be constructed unless hydroelectric power shares the cost.

Public development of hydroelectric sites is more feasible also because of the lower interest rates enjoyed by public agencies, and because public agencies can finance entirely with borrowed money and do not have to induce investors to put equity money into their ventures. These factors are extremely important when considering the feasibility of hydroelectric sites, since a preponderance of the cost of hydroelectric power relates directly to investment.

The sooner we develop our hydroelectric sites, the lower the cost of such development is likely to be. Most river basin plans include storage reservoirs to hold back flood waters for later release. Such reservoirs are feasible, however, only if land is relatively cheap and unimproved. The settlement of reservoir sites with communities or towns or cities may make the cost prohibitive.

SAVING OF FUELS AND RELATED FACTORS

If the United States in 1951 could have generated all its electric power supply from its hydroelectric resources, it would have saved more than 120 million tons of coal, 65 million barrels of liquid fuels, and 800 billion cubic feet of natural and by-product gas consumed last year in thermal electric generating plants. On the other hand, if none of its water power had been in operation in 1951, it would have required the burning of 50 million tons of coal *or* 1,400 billion cubic feet of gas, *or* 230 million barrels of residual fuel oil to replace the electric energy generated in our hydroelectric plants.

This considerable saving of fossil fuels which cannot be renewed is, of course, accompanied by important savings in transportation of fuels by railroads, pipelines, tankers, and barges. Also, manpower for mining coal, drilling oil and gas wells, and operating railroads and pipelines will probably be more expensive in future years. Production of hydroelectric power requires none of this labor, once the plant is built.

SAVING OF ORES

When power is low in cost, it can be used to smelt and refine the important metals contained in low-grade or complex mineral ores. It so happens that while nonelectric processes may be preferred, or are at least acceptable, for high-grade ores, in many cases only electric processes can be used for the lower-grade minerals.

For example, the taconite ores of the Mesabi Range in Minnesota will require 75 kw.-hrs per ton for magnetic separation in order to upgrade the ores prior to their shipment to steel mills. This compares with only 2 to 3 kw.-hrs. to prepare high-grade ores for shipment. The only commercially feasible nickel operation in the United States will use electric furnaces to recover approximately 60 pounds of nickel per ton of ore. The greatest bulk of the western phosphate deposits is low-grade rock. Only the high-grade rock, 30 per cent or more P_2O_5 content, can be used for the production of triple superphosphate fertilizer by the wet or sulphuric acid process. Electric furnaces can smelt lower-grade rock with a P_2O_5 content as low as 25 per cent. By using higher grades of rock to mix with rock of less than 25 per cent P_2O_5 content, the total tonnage of usable rock can be greatly increased. All these are examples of the use of electric energy to develop and conserve our supplies of materials. By making feasible or economical the recovery of metals and chemicals from low-grade sources, electric energy performs an important conservation function.

CO-ORDINATION OF PLANTS

Conservation of hydroelectric power, we noted, means not only the development of our water power sites but also the development of the full potential of each site. Actually, it means also development of an entire river system to maximize the energy production of all sites on the system by co-ordinated and integrated planning and operation.

A good example is the integrated operation of Hungry Horse Dam, now under construction by the Bureau of Reclamation on the south fork of the Flathead River in Montana, with downstream plants in Canada and the United States. Co-ordination of operation in this case means storing water for four months each year for release during the eight months when flows of other streams are at a minimum. Hungry Horse and downstream power plants will produce 402,000 kw. more prime power by this method of operation than if Hungry Horse Dam were to be operated on an isolated basis and its storage were to be released uniformly throughout the year. An almost identical type of operation will produce 1,124,000 kilowatts of prime power at Hells Canyon Dam and downstream plants, in comparison with only 532,000 kw. if Hells Canyon Dam and power plant were operated on an isolated basis.[2]

Such co-ordination of operation of plants is possible only if high-capacity transmission systems interconnect the plants on a river system so that large blocks of power can be shifted from plants with surplus power production during parts of the year to areas which would otherwise be served by plants like Hungry Horse and Hells Canyon operating on an isolated basis.

IMPORTANCE TO THE ECONOMY

In a paper I presented at the 1950 meetings of the American Economic Association, I stated:

> The capitalistic system flourishes under an expanding and dynamic economy. It dies under a contracting or static economy. Our system has made its greatest strides by increasing productivity per manhour. This increase has been accomplished by mass production and the machine tech-

---

[2] In addition, Hells Canyon storage along with other Columbia River storage results in greater prime power at all system plants, through co-ordination of operation. Hells Canyon's share of this greater prime power amounts to 306,000 kw. Thus total power attributable to Hells Canyon is 1,430,000 kw.

nique. The expansion of machine production has been built on an expandable and cheap supply of energy in the form of coal, oil, gas, or falling water.[8]

If we are to continue to increase production, we must have larger supplies of low-cost energy. The use of electric energy in industrial plants has increased from 2.61 kilowatt-hours per man-hour in 1929 to 4.60 in 1939, 5.71 in 1947, and an estimated 6.29 in 1950. This ratio must keep rising if productivity is to continue to increase. The conservation of water power will contribute to the energy supplies required to increase the productivity of labor. It will help this country to maintain a dynamic economy, the backbone of the capitalistic system.

These larger supplies of low-cost electric energy can be obtained if the program of the Federal Government to develop the economical hydroelectric sites in this country is achieved. Included in this program are: the development of the St. Lawrence Seaway and Power Project, the redevelopment of Niagara Falls, and the major projects on the Columbia River and its tributaries in the Pacific Northwest. The construction of these projects represents the next important step in the conservation of hydroelectric power in the United States.

Paul J. Raver, Ph.D., Portland, Oregon, has been Bonneville Power Administrator since 1939. He was previously engaged in several engineering and utilities activities, and served as assistant professor and head of the Department of Public Utilities at Northwestern University. He is author of various monographs and articles in the public utilities field.

---

[8] Paul J. Raver, "Government Action and Private Enterprise in River Valley Development: A Public Administrator's View," Papers and Proceedings, *American Economic Review*, Vol. XLI, No. 2 (May 1951), pp. 296–97.

Private Forestry in Transition

By Samuel T. Dana

FROM colonial days to the present, the forests of the United States have played a major role in its development. They have built its homes, supplied the raw material for many of its manufactured products, provided containers for their shipment, and helped to prevent erosion and floods. These products and services have come, and must continue to come, mainly from the three-fourths of our forest area that is in private ownership. What are the prospects that this area of 345 million acres will be so managed as to guarantee adequate future supplies and services?

Until recently most students of the situation have viewed it with uneasy concern or even genuine alarm. For more than half a century they have emphasized the key position in the national economy occupied by forest lands in private ownership, and have successively proposed public co-operation, public regulation, public ownership, and private initiative as means of assuring their effective management.

Public Co-operation and Regulation Proposed

In 1899 in his first report as Chief of the Division of Forestry, Gifford Pinchot commented optimistically on the program which he had initiated to further the practice of forestry on private lands by public co-operation in the preparation of forest working plans. The response was encouraging; but the resulting plans so commonly gathered dust in a convenient pigeonhole that some ten years later a wag summed up progress with the remark that "forestry is now being practiced everywhere except in the woods." The co-operative approach was renewed in different form in the Weeks Act of 1911, the Clarke-McNary Act of 1924, the Norris-Doxey Act of 1937, and the Cooperative Forest Management Act of 1950. Results have been more substantial, but have fallen far short of bringing private forest lands in general under even fairly satisfactory management.

In 1919 the Forest Service, under the leadership of Henry S. Graves, and the Society of American Foresters, under the leadership of Frederic E. Olmsted and Gifford Pinchot, started a campaign to solve the problem by public regulation of cutting on private lands. Mr. Pinchot summarized his views with characteristic vigor:

> Forest devastation will not be stopped through persuasion, a method which has been thoroughly tried out for the past twenty years and has failed utterly. Since otherwise they will not do so, private owners of forest land must now be compelled to manage their properties in harmony with the public good. Pressure from without, in the form of public sentiment, crystallized in compulsory nation-wide legislation, is the only method that promises adequate results. To apply this method successfully means to fight.

Legislatively, the only immediate result of this campagin was the strengthening of the federal program in the fields of public co-operation and public ownership by the passage of the Clarke-McNary Act. Today federal regulation, in spite of sporadic attempts by the Forest Service to obtain its adoption, seems more remote than ever. State regulation has made some progress, but is neither sufficiently widespread nor effective enough to offer any real promise of providing a panacea.

PUBLIC OWNERSHIP PROPOSED

In 1933 the Forest Service, in the Copeland Report ("A National Plan for American Forestry"), subordinated public co-operation and public regulation to public ownership as the most effective means of solving the forest problem. This report prepared under the supervision of E. H. Clapp during the incumbency of R. Y. Stuart as Chief of the Forest Service, expressed the view "that practically all of the major problems of American forestry center in, or have grown out of, private ownership." To meet the situation, it recommended the acquisition of 134 million acres of forest land by the Federal Government and of 90 million acres by state governments. This proposal, which would have more than trebled the area of commercial forest land at that time in public ownership, was made during the depth of the depression when some private owners, particularly in the West, were inclined to regard their forest lands as a liability rather than an asset, and to regret that the government had ever allowed them to assume the "burden" of ownership. It was endorsed by Secretary of Agriculture Henry A. Wallace, who strongly recommended the earliest possible action on the federal part of the plan.

Although the area of forest land in public ownership has increased substantially in the last twenty years, this increase has been meager indeed in comparison with the goal set by the Copeland Report. Today the Federal Government owns 19 per cent of the commercial forest area, and state and smaller units of government 6 per cent, with no apparent likelihood of any marked increase in either category. That we shall now attempt to solve the problems created by private ownership by largely abolishing such ownership seems most improbable.

SELF-REGULATION

The year of the Copeland Report (1933) may also be regarded as the year of the first attempt to put private forestry on the map by mobilizing private initiative on a nation-wide scale. Article X of the Code of Fair Competition for the Lumber and Timber Products Industries provided that:

> the applicant industries undertake, in co-operation with public and other agencies, to carry out such practicable measures as may be necessary for the declared purposes of this code in respect of conservation and sustained production of forest resources.

Wilson Compton, general manager of the National Lumber Manufacturers Association, promptly announced that "this is an industry undertaking. It will be so administered."

Two large conferences of representatives of industry and of the general public led to agreement on the principles to be followed in the drafting for each forest region of the country of codes of forest practice which would have the force of law. This procedure, known as "self-regulation," was lauded as a desirable and effective alternative to public regulation.

Considerable progress in the preparation and adoption of regional rules of forest practice had been made by the spring of 1935, when the National Industrial Recovery Act was declared unconstitutional by the Supreme Court. Thereupon the interest of most forest owners and operators in the entire enterprise suddenly waned, although in some regions consideration was given to the desirability of going ahead with the program in spite of the invalidation of the act. This loss of interest may have been due to economic conditions (the depression was still with us), to lack of faith in the virtues of forestry as a voluntary undertaking, or to preoccupation with other matters. Whatever the cause, it strengthened the skepticism of those who believed that self-regulation would materialize only under the spur of legal compulsion; and it led F. A. Silcox, currently head of the Forest Service, to renew the campaign for public regulation.

One region where organized effort by industry to push private forestry did crystallize into definite action was the Pacific Northwest. Here the timber associations took seriously the excellent rules of forest practice which they had developed. Sustained timber production, in their judgment, was highly desirable from both the public and the private point of view, Article X or no Article X. Two developments of major consequence soon followed, both in 1941: (1) the passage by Oregon, with the support of the timber interests, of legislation requiring private owners to adopt minimum standards of forest practice; and (2) the inauguration of the tree-farm movement by the establishment of the Clemons Tree Farm in Washington by the Weyerhaeuser Timber Company.

The same year saw the organization of American Forest Products Industries, Inc. (AFPI)—the educational arm of the forest industries. Under its aegis the keep-green and the tree-farm programs have gone steadily forward, accompanied by a vigorous campaign for the education both of the general public and of forest owners. Regional associations and individual owners, and of course the federal and state governments, have also played an important part in the general advance.

STATUS OF PRIVATE MANAGEMENT

Where, then, does private forestry stand today, and what are its prospects for the future? Is the perennial problem of American forestry—management of private lands—actually on its way to a satisfactory solution? Is the outlook as rosy as the optimists in industry believe, or as dark as the pessimists in government fear?

The answer to these questions, in the judgment of a middle-of-the-roader like the present writer, is that private forestry is in a state of transition from a position of minor importance in the national economy to one of major importance. It has come a long way in recent years; it still has a long way to go; and liberal public participation in the forestry enterprise will continue to be necessary for satisfactory progress.

Private forestry has gone farther in the last decade than in all the previous years of our history put together. The number of well-managed properties has jumped suddenly from the hundreds into the thousands. The rapidity of the change is dramatized by the growth in the number of tree farms from one in 1941 to more than thirty-five hundred today. Their number and distribution as of March 1, 1952, were as shown in Table 1.

TABLE 1—TREE FARMS AS OF March 1, 1951

Region	Number	Per Cent	Acres	Per Cent
West	492	14	8,649,830	35
South	1,899	53	14,204,200	57
Lake	497	14	1,503,662	6
Central and Plains	346	10	150,629	1
Eastern	307	9	354,917	1
United States	3,541	100	24,863,238	100

According to AFPI, the sponsor of the tree farm movement,

> A tree farm is an area of privately owned forest land devoted primarily to the continuous growth of merchantable forest products under good forest practices. . . .

Tree farming, like the raising of any crop, is a practical business venture.

Both the idea and the name have proved so popular that thirty-three states now have formal tree-farm programs. Each of these states has a responsible agency to establish and enforce standards of practice, compliance with which entitles an owner, whether of a small farm woodlot or a large industrial holding, to be officially certified as a tree farmer.

In interpreting tree-farm figures such as those given above, two offsetting facts must be kept in mind. In the first place, many of the properties included in them were being well managed in pre-tree-farm days. Secondly, they do not include well-managed properties that have not yet been registered or that are in non-tree-farm states. Statistical accuracy, however, is not necessary to prove to the careful observer that there has been an unforeseen and highly gratifying upsurge in the practice of private forestry. This is most evident on the lands of pulp and paper companies, which have been leaders both in the area placed under management and in the quality of that management. Their interest is due to the phenomenal growth of the industry, which increased its production even during the depression; to its heavy capital investment, which makes an assured supply of raw material indispensable; and to technological advances, which have made possible the utilization of species and grades of material that were formerly unavailable.

ACTIVITIES OF THE INDUSTRY

The new attitude is well stated on the letterhead of the country's largest private timberland owner: "Timber is a crop." It finds expression in the woods, both on tree farms and elsewhere, in more effective control of fire, insects, and disease; in thinnings, cleanings, and other silvicultural treatments in immature stands to improve the quality of the final crop; in the conduct of harvesting operations so as to obtain natural reproduction of desirable species in adequate amount; in the artificial reforestation of denuded areas; in the development of permanent systems of transportation; and in the practice of sustained-yield management, through which the balancing of growth and drain assures continued forest production for an indefinite future. It also finds expression in the general acquisition by larger owners (especially in the paper industry) of small holdings which for economic reasons cannot be handled satisfactorily by their present owners and are likely to be much better managed as integral parts of an extensive timber-growing enterprise.

In some instances private management is even more intensive than that on national forests, where standards have long been high. Moreover, the Southern Pulpwood Conservation Association and several individual owners assist smaller owners without charge in the management of their land. Such assistance may include the marking of the trees to be cut in a logging operation and the furnishing of planting stock for reforestation purposes. This is not entirely an altruistic gesture, but rather an intelligent approach to the problem of assuring an adequate supply of wood to meet the manufacturer's needs for raw material.

All these activities are normally conducted under the professional direction of a trained forester, who may be on the staff of the owner, employed by him on a consulting basis, or made temporarily available in an advisory capacity by a public agency. Some 5,100 foresters are now estimated to be employed by industry. Several of the larger companies have a score or more of foresters on their payrolls, many in positions of responsibility for the determination of policy as well as of technical practice. A few concerns go so far as to employ specialists for research in such fields as forest pathology, forest entomology, and forest soils. Experimental forests, sometimes aggregating many thousand acres, are not uncommon. One of the most encouraging features of the situation is that current openings for foresters in private employ considerably exceed those in public employ.

PUBLICITY WORK

Prominent in the efforts being made in many quarters to put private forestry on the map is American Forest Products Industries, to which reference has already been made. This organization has been largely responsible for putting across the keep-green program in 31 states, the tree-farm program in 33 states, and the more-trees program in 6 states. It issues a large volume of attractive literature designed to get more forestry practiced on private lands; to inform the general public, and especially school children, as to the importance of forests, forest products, and forest industries in the life of the nation; and to make known what industry is doing to assure adequate future supplies. In 1951, for example, educational material was sent to 89,000 schools in all parts of the country.

Naturally, activity of this sort has led to the charge that industry is indulging in propaganda to lull the American people into a false feeling of security. Careful study of the literature issued both by AFPI and by individual companies fails to substantiate the charge. While the general presentation is usually optimistic, sometimes perhaps too optimistic, reference is nearly always made to the fact that the forest situation as a whole is not satisfactory, and that all of us must put our shoulders to the wheel to make it more so. If this constitutes advertising and window dressing, it must be remembered that advertising and window dressing are part and parcel of the entire system of private enterprise. From radio and newspaper to the department store's window display, they are characteristic of American business. And is it any wonder that timberland owners should emphasize the bright spots in the present picture after the names they have been called and the unfavorable publicity they have previously received?

MOTIVATION OF ADVANCE

The important question is: How permanent and how effective is the recent upsurge in private forestry? In an economic world, it is encouraging that the primary cause of the new interest is an economic one. Owners have not suddenly "got religion" or become panicky because of fear of federal regulation; nor are they unduly influenced by the opportunity to invest in their own business funds that would otherwise go to the government as income taxes. They have decided to go into the business of growing timber because it pays. High stumpage prices, the closer utilization of inferior material made possible by advances in wood technology, and the necessity of protecting heavy investments in land and mills now justify practices which most owners, rightly or wrongly, formerly regarded as uneconomical. Added to the economic motive, on the part of some at least of the larger manufacturers, is a sense of responsibility for the maintenance of the communities supported by their plants.

Enlightened self-interest thus provides a solid foundation which offers real promise of permanence. Another depression would undoubtedly lead to some decrease in expenditures for forestry by private owners, just as it would lead to economies in other directions. That it would result in the virtual abandonment of any considerable part of the present program is most unlikely, particularly in the case of manufacturers with heavy capital investments. The stakes are too high.

GOOD BUT NOT GOOD ENOUGH

On the other hand, accomplishments to date in relation to needs give no cause for complacency. Forest Service estimates showing the status of forest management in 1945 are given in Table 2. Additional areas have come under management since that date, and the intensity of management on other areas has no doubt increased. Even so, the level of management of the private forests is clearly low, both intrinsically and in comparison with that of the public forests. This is notably true of the small holdings (less than 5,000 acres) and the medium-sized holdings (5,000 to 50,000 acres), with only 4 and 8 per cent respectively under good or better management. The large owners, particularly the pulp and paper companies, are doing much better, with 29 per cent of the area involved under good or excellent management; but this group includes only 15 per cent of the total forest area in private ownership.

TABLE 2—CHARACTER OF CUTTING IN 1945
(Per cent)

	Good and Better	Fair	Poor and Worse
Private ownership	8	28	64
Small	4	25	71
Medium	8	31	61
Large	29	39	32
Public ownership	67	19	14
National forests	80	19	1
Other federal	43	32	25
State and local	47	10	43
All lands	23	25	52

A closer look at the situation in one of the most productive forest areas in the country, the southern pine region, is revealing. Here the pulp and paper industry has increased its output nearly ten times in the last twenty years, with another marked expansion scheduled for the immediate future. Although pulp and paper manufacturers are almost uniformly practicing good forestry on their own lands, these are far from adequate to meet their requirements. They must therefore obtain about half of their wood supply, in competition with the lumber industry and other wood-using industries, from other lands. Of these, the most important are the small ownerships, which greatly predominate in the region, and only 2 per cent of which are being well handled. Clearly, the progress which has so far been made, spectacular as it is on some individual properties, is far from enough.

Forest Service estimates also show that the total growth of the forests (in cubic feet) approximately equals the total drain resulting from cutting and from losses by fire, insects, and disease, and that the growth of sawtimber (in board feet) is about two-thirds of the drain. Do these figures mean that more widespread and more intensive forest management, whether on public or private lands, is not really an urgent necessity? They mean no such thing, unless we are to be satisfied with a static supply of wood in an expanding economy; and unless we are willing to reduce drastically our consumption of saw timber, on which we now depend for many important uses.

Wood, in spite of the much-advertised increase in the use of substitutes, continues to be the "universal raw material." Far from being "obsolete," it is constantly finding new uses and being improved for old uses. From lumber, plywood, and the myriad articles manufactured from them, to turpentine and rosin, paper and its products, lignin, sugar, alcohol, vanillin, and other chemical derivatives, forest products enter into our daily life not only in many obvious but also in many unrecognized ways. Our whole economy will be richer or poorer as they are abundant or scarce.

Liberal use of forest products is desirable because of their renewability as well as because of their utility. It is reassuring to know that about a fourth of our total land area is best suited to the production of forest crops, and that these 461 million acres, *if properly managed,* would permanently provide a much larger yield than we are now harvesting.

THE SOCIAL REQUIREMENT

Is any such addition to the national wealth in the form of increased forest production likely to result from private enterprise alone? In spite of the recent highly encouraging developments in private forestry, the answer is almost certainly No. The job is of a nature and a size to require public participation. There is nothing inconsistent with the "American way of life" in this conclusion.

The institutions of private property and private profit are based on the theory that they best serve the interests of society as a whole. Here in the United States we are convinced that this is the case; but when unrestricted freedom of enterprise fails to render optimum service or results in actual disservice, the community does not hesitate to intervene. Public schools, agricultural experiment stations, blue-sky laws, pure food and drug acts, regulation of public utility rates and service, incentive payments, zoning ordinances, control of stream pollution, and national parks, to pick just a few examples, all bear witness to this fact.

Experience both here and abroad shows that forestry is a field in which such intervention is often desirable. Many owners are either unable or unwilling to handle their lands in such a way as to assure their continued productivity. When forest supplies are abundant in relation to the demand, this fact may have little social significance. When the situation becomes reversed, it may be of outstanding importance. Indeed, as population expands and natural resources shrink, the point may well be reached where the way in which they are managed is of more concern to the community at large than to their individual owners.

The United States cannot raise the standard of living for its own rapidly mounting population, nor can it exercise effective leadership in a bankrupt world, without wise use of its natural resources, among which forests are of major importance. The goal must be reached chiefly through action of private owners, but with a reasonable measure of the three forms of public participation with which we are already familiar.

FORMS OF PUBLIC PARTICIPATION

Public co-operation is exemplified in such fields as protection of forests from fire, insects, and disease; research; education; provision of planting stock; and on-the-ground aid in the management of specific properties. These activities are almost universally approved, including the liberal use of federal grants-in-aid administered by state agencies. They have demonstrated the ability of private owners and of federal and state officials to work together in the formulation and execution of constructive programs in which the participation of all concerned is on a wholly voluntary basis.

Public regulation commands less favor, even at the state level; but it is likely to prove necessary, particularly in connection with "protection forests," unless forest owners as a whole prove more amenable to educational influences here than they have proved in even such forest-minded countries as Norway and Sweden. It is significant that in Oregon and Washington, which now have the most drastic laws of any of the states, the legislation had the backing of the very owners who were to be regulated; and that in Washington these owners helped to get a decision from the state Supreme Court upholding the constitutionality of the act. In the words of L. F. Watts, chief of the Forest Service, regulatory measures constitute the "rules of the game" and "are as necessary in resource management as they are to transportation, communication, and other enterprises that affect the public welfare." Although mandatory in form, the fact that they automatically force an owner to consider the basic problem of sustained forest production gives them great potential educational value, which is magnified if private owners themselves participate in the regulatory process.

Public ownership to the extent of 25 per cent of the commercial forest area has resulted from the reservation of lands originally in federal or state ownership (chiefly the public domain), from the acquisition of additional lands by purchase or exchange, and by the retention of tax-delinquent lands. They include largely lands that are (or have been) submarginal for private ownership, and that are needed for purposes such as watershed protection and recreation, which are generally recognized as a public responsibility. The character of their management is less subject to the ups and downs of the business cycle than is the management of private lands, and they can be used for the production of timber of larger size and higher quality than most private owners can afford to grow. This latter function will continue to be an important one until the highly uncertain arrival of the day when technology makes it possible to substitute built-up and synthetic products for high-grade lumber and plywood with equal satisfaction from the standpoint of cost, utility, and beauty. That the present pattern of ownership is the best that could be devised is unlikely; but that a considerable backlog of public forests is highly desirable as a means of promoting stability and of providing intangible but essential services can hardly be doubted.

SUMMARY

To sum up, private forestry is in a state of transition. Timber mining is at last being replaced by timber cropping on a substantial scale. Great credit is due to the individuals, companies, and organizations whose leadership has been responsible for the change. The evidence is convincing that the new attitude is here to stay, and that the movement which they have started will continue to spread.

Enthusiasm over recent progress should not, however, blind us to the fact that it is only a good beginning. Evolution, not revolution, is the order of the day. Neither the area of private forest land now under management nor the average quality of that management gives any assurance of a continuing supply of forest products adequate to meet the needs of a nation with a rapidly expanding population, a desire for ever higher standards of living, and a responsibility for world leadership. Current efforts by private owners must be intensified, extended, and supplemented (not supplanted) by appropriate activities on the part of public agencies.

Private forestry in the United States has come far in the last ten years. It has still farther to go. With full cooperation on the part of all concerned, there is reasonable hope of success in attaining the common objective of enabling our forest resources to play the part they can and should in promoting and maintaining the prosperity of the nation. Industry's present attitude arouses hope and confidence that the transition from negligible planned production, through substantial production, to full production on the 75 per cent of our forest area in private hands will be faster than we had dared to hope. The prospect is one to encourage optimism but not complacency.

Samuel T. Dana, Sc.D., Ann Arbor, Michigan, is Filibert Roth University Professor of Forestry at the University of Michigan. He previously served in various capacities with the United States Forest Service for some twenty years, and has represented the United States Department of Agriculture, the Society of American Foresters, and Yale University at international conferences. He is author of many bulletins and reports in his field, and is a contributor to the Journal of Forestry, of which he was editor in chief for six years.

"Big" Versus "Little" Lumber Operators in the Pacific Northwest

By Daniel L. Goldy

A STRUGGLE is going on in the lumber industry of the Pacific Northwest, the outcome of which will have important consequences for the future economic health and strength of the United States. It is popularly referred to as the battle between the "big" and the "little" lumber operators. But this is to some extent an oversimplification. Measured exclusively by size of mill, volume of raw material consumed, or value of output, one might be confused in finding some large operators on the side of the little fellows and some relatively small operators on the side of the big fellows. A more accurate delineation distinguishes between those operators who wish to stifle competition, particularly by controlling the basic raw material of the industry, and those who feel that they are dependent upon free competition and an open timber market for survival. Of course, those who are in a position to monopolize a significant portion of the timber supply in an area do not define "free enterprise" in the same way as those who must find their logs wherever they can compete for them.

Northwest Timber Resources

To appreciate the issues involved, one must understand something of the nature of the Pacific Northwest lumber industry and its importance to the economy of the United States. The Pacific Northwest contains over 40 per cent of the remaining saw timber in the United States. A substantial portion of this timber is in the Douglas fir belt of western Oregon and western Washington, which currently produces about one-third of the nation's timber requirements. Inasmuch as the predominant species in this area—Douglas fir—provides excellent structural lumber for housing and other types of construction, the area's resources have been under increasing pressure during the war and postwar construction and housing booms.

With better housing as one of the primary items in the aspirations of Americans for a higher standard of living, there is little likelihood that the pressure on the Northwest timber resources will diminish in the future. As was true in the New England and Middle Western timbered areas of the United States, the lumber operators of the Pacific Northwest have been cutting the timber resources for some time at a rate substantially in excess of a sustained-yield capacity. Citizens of communities which are dependent upon the forest resource for their principal means of livelihood, and operators who must maintain a flow of logs to their mills in order to continue operating, are becoming increasingly concerned about the imbalance in the forestry budget.

One of the clues to the problem, however, is in the definition of what constitutes sustained-yield capacity. At the present level of utilization—which involves on the average about 50 per cent waste—estimates of sustained-yield capacity in the Douglas fir belt range between 3.8 and 5 billion board feet a year. In 1951 the mills of western Oregon and Washington produced over 11 billion board feet of Douglas fir lumber. It is estimated, however, that with reasonably full and proper utilization of the timber resources—based on processes which have been tried and proved and for which a market is believed to exist—the sustained-yield capacity would be in excess of 14 billion board feet, rather than the 3.8 to 5 billion board feet. To achieve this goal would require extensive investment in secondary and diversified forms of forest products manufacture.

The overcutting that has taken place in the Pacific Northwest has been largely on privately owned timber lands. This has resulted in a major shift in the proportions of private and government timber ownership during the last decade. In 1940 it was estimated that approximately 50 per cent of the merchantable timber in the states of Washington and Oregon was owned by the Federal Government and 50 per cent by private operators. By 1950 the proportion had changed to approximately 70 per cent in government ownership and 30 per cent in private ownership.

MONOPOLY TACTICS

With timber becoming increasingly scarce, its availability is the primary determinant of whether any given operation can continue in business or will be forced to close down. Those operators with substantial or strategic holdings of private timber—whether considered big or little by other standards—tend to form a block dedicated to shutting off access to timber for other operators not so fortunately situated. There is a variety of techniques by which this is done, but the objectives are: (1) to acquire the exclusive opportunity to purchase and cut the tracts of timber held in scattered private ownerships in the drainage in which they operate, enabling them pretty much to set the price; (2) to obtain exclusive control over the federal timber in the drainage, which in many instances represents the principal raw material supply of the future; and (3) to freeze out present competitors by denying them access to the raw material needed to keep them going.

Control of access

Of the various techniques employed to accomplish these objectives, the most effective and most widely practiced relates to control of the means of access to the privately or publicly owned timber involved. In the early days of lumber operations in the Pacific Northwest, the large operators would locate their mills at tidewater or other strategic locations and would build logging railroads into the virgin forest areas. These private railroads would furnish the exclusive means of access, enabling the lumber company concerned to dictate what timber would be cut and removed, when it would be purchased, and the price which would be paid, regardless of who actually owned the timber.

With the advent of the logging truck and portable yarding and bucking equipment, it became more difficult for a few large operators to maintain such exclusive control. Hundreds of small operators came into the business. Access to the timber was obtained by extending logging roads into the drainages from state and county roads. The large companies soon recognized the potentialities of competition from this source, and considerable investments were made in acquiring strategic parcels of land located at the neck of the drainage bottle, in acquiring rights of way for the construction of roads, or in actually constructing the first segments of roads that would ultimately tap all the timber in a given drainage. Among the rights of way obtained were those over government-owned lands, generally granted in the early days without any thought to the question of preserving the public's interest in access to its own timber.

Those companies which stood to gain by exclusive control of logging roads vigorously opposed requests for governmental appropriations for the construction of access roads to overmature and decaying stands of federal timber, despite the obvious need for such roads in the interests of lumber production and conservation. Among their principal arguments before congressional committees were their willingness to build the roads themselves and their belief that they could do it better and more cheaply.

These operators did not explain to the Congress that a substantial part of the cost of constructing these "private" access roads was borne by the government timber. It has been the practice of the Forest Service and the Bureau of Land Management—the two federal agencies primarily involved—to make generous allowances in timber appraisals for the cost of road construction. Thus, if a tract of timber were valued at $100,000, it might be offered for sale at $70,000, the difference being an allowance to defray the cost of private road construction. By this method the federal agencies have in some instances repaid to private operators the entire amount invested by them in road systems, but have left the roads in their complete, undisputed, and exclusive control. The private operators continue to enjoy the right of exclusive access to the federal timber in the drainage, as well as to such privately owned timber as they themselves do not own.

Preference in sales

Another technique by which certain operators are able to control the federal timber being offered for sale is to obtain preference from the government foresters in the planning of the sales, so that only the preferred operator is able to purchase the timber offered. This preference can be accorded in several ways: by offering blocks of timber adjacent to the preferred operator's present area of cutting or in accordance with his cutting plan so that the time and place of the sale favor him; by laying out the "settings" in such a way that they do not constitute an economic "show" for anyone but the owner of the adjacent land, whose timber must be logged with the offered federal timber to make it economically feasible; or to offer the timber in such large blocks that only the operator for whom it is intended will have sufficient financial resources to be able to bid on it.

These informal understandings by which federal timber is disposed of to preferred operators without open competition are clear violations of the spirit, if not the letter, of the applicable federal laws. These statutes require that federal timber be disposed of by open competition—except only where a co-operative sustained-yield agreement has been concluded in the manner prescribed by law. In the instances referred to above, such agreements were not in effect.

While discrimination in the disposal of government timber worth millions of dollars is inconsistent with law, it is not inconsistent with the philosophy which governs the actions of many of the federal foresters. That philosophy holds that only the big operators can practice good forestry, so in the interests of conservation and good forestry one should co-operate with the big operators to ensure that only they are purchasers of the government's timber. Those who subscribe to this point of view have concluded that what is essentially needed is monopoly in the private forestry field—where a few large companies control as much as possible of the private timber, and they (the federal foresters) control the companies through regulations prescribed by law.

Sustained-yield agreements

One of the favorite approaches to this type of utopia is the co-operative sustained-yield agreement mentioned above. In return for obtaining the exclusive option to purchase government timber at an appraised price, the private operator must subject the time, rate, and manner of cutting on his own forest lands to regulation by the government. Through the pooling of the federal and privately owned timber lands in a co-operative agreement, the federal statutes contemplated that sustained-yield forestry operations could be achieved, thereby guaranteeing the permanence of those lumber operations which constituted the principal employment source for dependent communities.

Only one co-operative sustained-yield agreement has been entered into thus far. It was concluded between the Forest Service and the Simpson Logging Company in Shelton, Washington. Since that time the storm of opposition from those lumber operators—as well as other interested groups—who would be excluded from the opportunity to bid for government timber by the granting to one operator of an exclusive sales option for time periods ranging up to one hundred years has been sufficient to shelve the proposals. But the battle is about to break out into the open again, as the time nears for a public hearing on a proposed co-operative sustained-yield agreement between the Forest Service and the Pope & Talbot Company in a forest area not far from Eugene, Oregon.

In January 1948 the Department of the Interior conducted a public hearing on a co-operative sustained-yield agreement which had been proposed by the Bureau of Land Management and the Fischer Lumber Company near Eugene, Oregon. At the hearing, representatives of the small and independent lumber operators, and of labor, farm, and conservation groups, expressed their accumulated bitterness at the "discriminatory" policies practiced by the federal agencies in the disposal of timber. Their charges were carefully examined by the Interior Department and in the main were found to be justified. As a consequence, a new policy and program was adopted by the Interior Department in June 1948 and the BLM was directed to take vigorous steps to carry it out.

THE NEW PROGRAM

The program can be summarized as follows: first, exclusive control of roads tapping the BLM timber was eliminated, and the roads were made available to whoever purchased the government timber. This was accomplished on an interim basis by withholding from sale those tracts of timber which were tapped by a privately owned road, unless the road owner would agree to make the road available to the purchaser of the government timber upon payment to the road owner of a fair price for using the road. On a long-term basis, the problem was attacked through the promulgation of new right of way regulations. Under these regulations the government receives rights to use access roads for the removal of its timber in return for granting private operators rights of way to build roads across government lands. In effect, such agreements for reciprocal road use are nothing more than agreements between the government and private operators each to permit the other to use those segments of roads which are located on each other's lands. The investment of the private operator is recognized, and fair compensation must be paid to him under the regulations when the road is used by another party for the removal of government timber.

Although such an approach to the granting of rights of way seems eminently reasonable, it touched off a bitter fight by the "big" operators. The regulations had been carefully worked out over a period of fifteen months in consultation with an advisory board appointed by the Secretary and representative of all points of view. After considerable pressure had been applied by their industry colleagues, the representatives of the "big" operators on the board repudiated their concurrence in the unanimous recommendation that the regulations be promulgated. A war chest was begun to fight the regulations in the courts, but thus far they have not been successfully challenged. They have proved practical in operation and have stood the test of public criticism.

Second, to eliminate discrimination an advance timber sale program was instituted and administered in consultation with public advisory boards established in each of the Forest Districts. Under this program, suggestions for tracts of land to be offered by the BLM are received by the operators, screened in accordance with clearly defined and previously announced standards, and a timber sale program for the following calendar year is formulated. District Foresters of the BLM who prepare the plan must explain to their district advisory boards why suggestions are accepted or rejected, and the principles of sound forestry that were followed in making their decisions. In December the plan for the following calendar year is advertised, so that all operators who are interested in the timber offerings know well in advance where and when the timber will come up for sale. In addition, timber is offered in small blocks so that even those operators with limited financial resources can afford to purchase one or more of the blocks as needed.

The district advisory boards referred to above are composed of representatives of the various segments of the lumber industry, both large and small, and representatives of farm, labor, grazing, recreation, mining, and other groups concerned with the administration of the program. Their participation in the program is an additional safeguard against the re-emergence in the BLM of the professional forester attitude which looks kindly on discrimination in favor of the "big" operator.

COMPETITION AND ITS EFFECTS

The elimination of discrimination in timber sales and the assurance of access to the timber for all who wished to bid resulted in greatly increased competition for the BLM timber. Whereas before there was an absence of competition in over 80 per cent of the timber sales made by the Bureau, under the new policies the figures in many sales were just the reverse. On the average there was more than a 100 per cent increase in competitive sales over the previous high period in the Bureau's history.

Competitive sales taught the Bureau something about the true value of its timber. It found that on the average it received about 55 per cent more than the appraised price whenever there was competition for the timber. Or stated in another way, when the Forest Service and BLM dispose of timber without competition, the operators receive a substantial windfall, and the United States Treasury and the counties—which share in the revenues from federal timber sales—are shortchanged.

In an area where 70 per cent of the merchantable timber is owned by the

Federal Government, the value of federal stumpage largely determines the value of private stumpage. Under the impact of competition, BLM stumpage has more than doubled in value during the past few years. This has in turn resulted in increasing the economic margins on all of the private timber in the area, so that the practice of good private forestry is increasingly feasible from an economic standpoint. This is reflected in the high values now placed on cutover lands which in past years had gone to the counties for taxes, and in the rapid growth of tree farms and other indexes of conservation in private forest management.

But the most important function of competition is to furnish the incentive for investment in new plants and equipment, particularly in secondary manufacturing which utilizes raw materials which were previously regarded as waste. In an industry where it is regarded as normal to waste 50 per cent of a dwindling and valuable raw material resource, incentives for increased utilization are urgently needed. Such an incentive exists when scarce federal timber goes to the operator who can make the best economic use of it as evidenced by his ability to pay.

Forest conservation will not be achieved in the United States by having government foresters decide who are the good and who are the bad operators; nor by setting up monopolies—regulated or unregulated; nor by stabilizing the lumber industry at the present levels of waste. Some regulation of private forestry practices is undoubtedly needed, and to a limited extent is being undertaken by some of the states. But the basic problem of forest conservation will not be solved until we have made economic the practice of full utilization. And the substantial investments in plants and facilities required to make full use of the large proportion of the timber resource which is now left in the woods or burned as waste, are most likely to be forthcoming if the normal economic incentives of free enterprise and competition are maintained.

Daniel L. Goldy, at present in France serving on the staff of the Director of the European Office of the Mutual Security Agency, was recently Pacific Northwest Regional Administrator, Bureau of Land Management, Department of the Interior. He was previously special assistant to the Assistant Secretary of the Interior, Washington, D. C. He has also served in several other government agencies, and was a lieutenant in the United States Navy during World War II.

Tree Farms Versus Regulation

By T. D. Stevens

THE early forest history of the United States is one of devastation and desolation. The pictures of destructively cut forests and fire-blackened previously forested areas are all too fresh in the minds of many, for these conditions were prevalent even past the turn of the century.

Several great fires burned hundreds of thousands of acres; yes, even millions of acres. The great Wisconsin fire of 1871 which started near Green Bay burned over one and a quarter million acres, destroyed several towns, and left six hundred dead in its wake. Even as late as 1918 the town of Cloquet, Minnesota was virtually destroyed by a fire which burned over 250,000 acres and destroyed over four hundred people. Other conflagrations just as destructive as those at Green Bay and Cloquet have occurred in other forested areas from Maine to Oregon.

Spectacular as these fires were, they accounted for only a very small part of the total destruction wrought by fire. Of far greater importance was the cumulative destruction of thousands of small fires year after year. Resulting from carelessness or deliberate sets, frequently as an aftermath of logging, fire has taken a terrible toll of American forest resources. All too often, the lumberman has been accused of being responsible for this blackened page of forest history. True, the lumberman may have been partially at fault, but the blame must be placed largely on the shoulders of an apathetic public.

History of Lumbering

The history of lumbering in this country is one of exploitation and migration. Early cutting started in New England shortly after settlement. For many years, Maine was the leading timber producing state. As Maine's virgin forests were depleted, New York became the leading producer, only to be superseded by Pennsylvania. About the time of the War between the States, the lumber industry began to migrate to the Lake States. Some of the finest forests ever seen by man grew in Michigan, Wisconsin, and Minnesota. In the minds of many, the forests were inexhaustible. The sawdust flew from one end of the Lake States to the other. Ruthless cutting was the order of the day, without provision or thought for regeneration and continuous forest production.

By 1880 it became apparent to many operators that the forests were not inexhaustible. They began to look elsewhere for new areas of virgin timber, and their gaze rested on the magnificent pine forests of the South. Before the Lake States were even close to being cut out, the lumber industry began to migrate southward. Southern mills were better capitalized and more efficient than their predecessors in the Lake States. Exploitation of the southern pineries took place at a very rapid pace.

During the last decade of the past century, with the end of the Lake States' timber in view and the end of the southern pineries easily calculable, the lumber industry began a planned movement to the colossal fir and pine forests of the Pacific Northwest. The center of the industry has remained in the Northwest since the turn of the century, although the end of the readily accessible virgin timber is clearly discernible today.

Fire and the "cut out and get out" policy of the lumbermen brought about the rapid depletion, often referred to as devastation, of a large portion of the nation's forest resource. To complicate the situation further, the migratory character of the lumber industry left economic chaos in its wake as it moved from one region to another. Vast tracts of land were left in a denuded condition, since the lumbermen had little or no interest in the inherent productive capacity of the land. There was always plenty of virgin timber over the next hill, virtually free for the taking. The idea of free timber coincided with our national policy of free land. We gave the land away almost for the asking, and the timber went with it. Originally, there were over five hundred million acres of forest land within the continental boundaries of the United States. It is not surprising that the early lumbermen considered the forests inexhaustible and free for the taking. In their time, they saw little need for permanency in a particular forest region. Ghost towns and all the other evils usually accompanying the exhaustion and depletion of a natural resource were commonplace in the cutover regions.

The lumbermen were no more to blame for this depletion than they were for the fires that raged across the lands. Furthermore, the rapid liquidation of our timber resources during a critical developmental period in our history helped to create a high degree of prosperity which ultimately brought the nation to world leadership. Without readily exploitable natural resources, this almost miraculous achievement would never have been possible.

Thus, by way of recapitulation, the early forest history of the United States was characterized by exploitation, fire and devastation. The exploitation wa justified, but it is indeed unfortunate that an enlightened public was no available to insist that the exploitation be carried out in conformity with good forest conservation practices.

BEGINNING OF CONSERVATION

Toward the end of the last century a few voices bewailed the "wanton destruction" of the forest resource and began to call for forest conservation The conservation movement first became effective in 1891 when the Federal Government enacted the Forest Reserve Act under which forest reserves were set aside from forested areas within the public domain. These forest reserves became national forests in 1905 when they were placed under the administration of the Forest Service within the United States Department of Agriculture. While the establishment of these federal forests was an important forward step in forest conservation, it represented only a mild improvement in the over-all picture, since exploitation and devastation continued on a majority of privately held timberlands.

The forest conservation movement continued largely under the crusading leadership of Gifford Pinchot, who became the first Chief Forester of the United States Forest Service in 1905. The conservationists clamored for federal regulation of cutting on privately owned timberlands. The lumber industry, on the other hand, reacted in a typical laissez faire manner by scathingly denouncing federal regulation as unneeded and undemocratic. If needed, said industry, regulation should be at the state level and not at the national level; federal participation should be limited to co-operation with the state and local agencies.

PROTECTIVE LEGISLATION

Most controversial questions are solved, for a time at least, by effecting a compromise. The first federal act influencing the management of privately owned forest land was the Weeks law of 1911, which was definitely a compromise from the regulation viewpoint. The Weeks law provided federal co-operation with the states in controlling fire on forested watersheds of navigable rivers.

Thirteen years later Congress passed the Clarke-McNary Act, which provided three-way co-operation in the control of forest fires. Under the act, the private owner participated in the program along with state and federal governments. The act has for its goal the protection of every forested acre in the United States. As a result of this pertinent piece of legislation, more than 80 per cent of all state and private forest lands receive organized fire protection. In many states, fire protection is compulsory. Today, fire, the Number One enemy of the forest, is definitely on the wane. Despite the progress made in fire protection and the beneficial effects it had on forest management, many continued to believe public regulation of cutting on private forest lands was needed.

The depression of the thirties brought the National Recovery Administration lumber code. The code was written largely by lumbermen at the request of the national administration. In the writing of the code William B. Greeley had no small part, for he was in effect, if not in fact, the spokesman for the lumber industry. At the time the code was formulated, Greeley was executive secretary of the West Coast Lumbermen's Association. Previously he had been with the United States Forest Service, where he became chief forester in 1920. His philosophy seemed to be one of co-operation by all people and agencies interested in the forests and their management, as opposed to strict federal regulation.

Article X of the lumber code required the industry to leave "its cutover lands in good condition for reforestation." When the Supreme Court sounded the death knell for the NRA, the lumber industry voluntarily agreed to continue complying with Article X. This was the first concerted act on the part of the lumber industry indicating an interest in forestry. This belated interest was not surprising, for there were many factors working to make lumbermen forestry minded. One was the continual threat of federal regulation. Another was the influence of the ever increasing number of technically trained foresters in the employ of lumber companies. But most important of all was the frightening realization that the end of the virgin forests was in view. No longer could cheap stumpage be obtained close by or by moving the mill to a new area. Lumbermen finally realized that they had to practice forestry if they were to stay in business.

POOR PRACTICES ON SMALL TRACTS

But this realization and voluntary compliance with Article X was not enough for the proponents of regulation. They knew that 76 per cent of all private commercial forest land was in small tracts. In many instances these holdings were not well suited to good forest management, because of their smallness and lack of affiliation with a permanent forest operation. Many owners of small forest tracts felt they could not afford to practice forestry. Furthermore, many tracts were in the hands of absentee owners who had little interest in the productive capacity of the land for growing timber.

A recent United States Forest Service survey[1] clearly showed cutting on 71 per cent of small commercial forest holdings to be poor and destructive. The regulationists had been very much aware of this fact for some time, and used it as verbal and written ammunition in their battle for regulation. In general, cutting on the larger forest holdings was shown by the aforementioned survey to be reasonably satisfactory; but industry knew something would have to be done to improve cutting practices on small private holdings if regulation was to be prevented.

THE TREE FARM MOVEMENT

Industry had consistently held that widespread improvement in private forest management practices could be obtained through education rather than by government decree. The most effective way to prevent regulation was to convince the public that it was unnecessary. To accomplish this, an improvement had to be obtained in private forest practices. About 1940 the Weyerhaeuser Timber Company decided to apply intensive forestry on a 120,000-acre logged-out tract near Montesano, Washington. To protect the area against carelessness with fire, and to teach the public that the company intended to grow a second crop of trees, the area was advertised as a tree farm. The term implied forest management for the continuous production of forest crops.

Public reaction was so favorable that the National Lumber Manufacturing Association initiated the tree farm movement on a national scale in 1941. The goal of the movement was to encourage the protection and permanent productive use of private forest lands. Co-ordination of the movement is now carried out by the American Forest Products Industries, Inc., which has as its aim "the promotion and development of sound economic forest practices and the development of a better public understanding of and co-operation with private forest enterprises." This organization encourages and assists in the initiation of the tree farm programs, keeps national records, and publicizes the movement.

Each state embracing the tree farm movement has a local sponsor, which may be the state forestry department, a state forestry association, a combination of two local organizations, or a regional wood-using industry group or association. Among the regional sponsors are Forest Conservation Committee of the Pacific Northwest industries, Western Pine Association, California Redwood Association, Southern Pine Association, Appalachian Hardwood Manufacturers' Association, and Southern Hardwood Producers, Inc.

There is more to tree farming than merely posting a tree farm sign on a piece of forest property. To qualify as a tree farm, a tract of forest or woodland must be located in a state where the American Tree Farm System operates. Size of the tract is unimportant. Tree farms vary from three acres to vast commercial holdings running to hundreds of thousands of acres. Of course, the woodland must be privately owned and maintained for the purpose of growing and harvesting commercial timber crops. Cutting practices must be of a character to ensure continuous crops of merchantable forest products. The woodland must also be adequately protected against fire, insects, disease, and destructive grazing. Any woodland owner meeting these qualifications may become a tree farmer by applying to the State Tree Farm Committee through the local sponsor. If the inspecting forester's report is satisfactory, and upon recommendation of the Tree Farm Committee, a Tree Farm Certificate is issued to the owner. Tree farm certification will be withdrawn should the land change ownership or should the owner fail to maintain high management standards.

---

[1] U. S. Forest Service, *Forests and National Prosperity*, U.S.D.A. Miscellaneous Publication No. 668, 1948, p. 48.

Slightly over ten years has passed since the first tree farm was established in Washington. Today, the American Tree Farm System has spread over thirty-three states. The number of tree farms is approximately 3,400, and the total acreage is in excess of 24 million. In the Douglas fir region of western Oregon and Washington, 37 per cent of all privately owned forests has been certified as tree farms. Great progress has been made in ten years. Significant as this progress has been, there is yet a long way to go. Actually, only about 7 per cent of the privately owned commercial forest land is in tree farms. Nevertheless, the movement is expanding steadily, and within the next decade or two it should be responsible for a marked improvement in forest conservation on privately owned forest lands.

A PROFITABLE BUSINESS

Tree farming, like any other business venture, must be profitable before it can be successfully sold to the public. The rapidity with which the tree farm movement has spread from coast to coast is eloquent testimony that it pays to be a tree farmer. Under normal conditions and under good forest management, most forest land will grow trees at a profit. We are truly just entering the "cellulose age," and as demands for wood and wood products increase, as they most surely will, tree farming will become more and more profitable. The American Forest Products Industries, Inc. cites the following typical examples of profitable tree farming on small private holdings.

A tree farmer in central Pennsylvania for the past twenty years has harvested an annual crop of 5,000 board feet of saw logs from his 130-acre wood lot. With the lumber he has built a modern eight-room house, a garage, an ice house, a chicken house, and an implement shed, besides keeping fences and other buildings in repair. In addition, he sells $300 worth of pulpwood and $50 worth of posts a year.

An Alabama tree farmer grossed $6,375, enough to send a son through college and law school, from timber harvests on a 286-acre wood lot. Today the wood lot is still producing regular cash crops and is in better condition than when the management program began.

An Ohio tree farmer with a 283-acre farm, of which 92 acres are in trees, averages a gross income of $2,000 per year from timber harvests off his land. His sales include selectively cut hardwood saw logs, Christmas trees thinned from hand planted stands, and veneer bolts.

A Washington tree farmer with a 50-acre stand of second-growth timber in eight years sold one million board feet of railroad ties, eight hundred cords of fuel wood, one million board feet of saw logs, and five hundred cords of pulpwood. Today his wood lot supports a thick stand of healthy, fast growing trees that will yield successive cash crops of wood.

An Oregon tree farmer owns 640 acres of land, all but 30 acres of it wooded. Since establishing a forest management program, the farmer has harvested 13,500 cords of firewood and several hundred dollars worth of pulpwood. In addition, he has cut enough saw logs to provide lumber for a new house and other farm buildings.

AN ANSWER TO REGULATION

The tree farm movement is an admission by the wood-using industry that more forestry is needed in the management of private forest lands, and the industry proposes to obtain it by education and self-discipline—regulation, if you like, by and within the industry. Tree farming is industry's answer to state or federal regulation. It is a democratic answer, an American answer. Let us hope it will prove to be the correct answer for the furtherance of good forest management on private forest lands without government regulation.

T. D. Stevens, Ph.D., East Lansing, Michigan, is head of the Forestry Department at Michigan State College. He has also served as head of the Forestry Department at Alabama Polytechnic Institute and as assistant professor of range management at Colorado Agricultural and Mechanical College, and spent several years with the United States Forest Service. He is author of several technical articles and bulletins.

A Program for the Redwoods

By Dewey Anderson

THE redwood forest of California stretches for 250 miles from the Oregon border southward to Sebastopol. Some of the oldest trees in the country grow there. Out of two million acres some 700,000 are in virgin growth. A large amount of Douglas fir and other white woods add to the value of this California resource.

This resource is being used up rapidly. Far more than half the cutting practices were described by the United States Forest Service as poor or destructive. Within our time, large parts of the forest will probably become ghost areas, offering neither work nor recreation for the increasing population of the state. The high prices of recent years have speeded up the cutting process.

Private conservation groups have been able to set aside a few small areas of the finest and oldest trees, and to save them from destruction. However, there will never be enough private money to save the whole area. It can and should be lumbered so that the useful trees are taken before they deteriorate, and so that replanting becomes an essential part of the process. By 1946 some 30 per cent of the redwood forest had been so badly wrecked that restoration to a highly productive forest would take 120 years.

What the Forest Service said in its 1946 survey was:

> Of all the redwood lands cut over to date, 56 per cent are growing little or no timber. The attempts made by the private owners to reforest a portion of these lands were unsuccessful and were abandoned. Restocking of these lands which have a tremendous growth potential should be a major objective for the area. . . . Ninety-five per cent of the timbered area within the proposed forest is privately owned. These lands are being cut over in such a manner that 80 per cent are left in a condition below acceptable standards of productivity.

THE PROPOSAL

Three years ago I worked out, together with Mr. Earle H. Clapp, the former associate chief forester of the United States, a program for the redwood forests.[1] The objectives of that program were to prolong and continue indefinitely the growth and value of the forest, to preserve the work opportunities of the people, to stabilize their community life, and to provide 124,000 acres of new state parks for recreational purposes. The method suggested was the establishment of a National Redwood Forest Corporation—financed by $125 million through loans from the Reconstruction Finance Corporation—which would purchase the forest lands and turn them over to the United States Forest Service for operation. The state would be asked to finance the new parks to the extent of $25 million, and would then own them and operate them. The forest debt could be paid off within sixty years at 2½ per cent interest, and the revenue from the forests would go on forever. The lumber companies and their workers would be continuously instead of temporarily employed.

The proposed National Redwood Forest area would cover about 2,100,000 acres. Of this, 708,000 acres are in old-growth redwoods and 220,000 are in old-growth Douglas fir. The four state recreation areas proposed would be made up of some of the best stands of the old-growth redwood. These areas would be owned and managed by the state of California, and would not be logged commercially.

---

[1] *An Action Program for the Redwood Forests*, Washington: Public Affairs Institute, 1949.

It is very important for the successful functioning of our democracy to bring local people into the affairs that touch their lives. In setting up a National Redwood Forest Corporation I suggested that one of the three members be nominated by the Governor of California. The chairman would be the Chief Forester of the United States. The third member would not necessarily be from California. But in addition, there would be a Redwood Advisory Committee, chosen by the Governor of California from representatives of agriculture, labor, industry, and the local communities in the forest area. This body could represent all the interests of the state very effectively.

This proposal is to keep the present logging companies in operation. It is *not* a proposal to put them out of business. It is simply to provide a mechanism by which they will be prevented from carrying on destructive cutting, and by which reforestation and cultivation can be given a chance to rebuild the forests. Private initiative is desirable, but where its chief result is the destruction of a valuable renewable resource, it should be prevented, for its own sake, from doing that harm to society. I tried to state my interest in maintaining a regular logging industry as follows:

> It might be possible in negotiating some purchases to use a repurchase-right plan to the advantage of both the Government and the present owners. Such an arrangement would be particularly applicable to large operating ownerships with heavy and unliquidated investments in manufacturing plants and logging equipment and facilities . . . the advantage to present owners would include relief from taxation on timberlands, interest on indebtedness and from carrying costs in general over an extended period. They would shift to the Government whatever risk there might be in carrying stumpage over many years. They would also be relieved of the high cost of road construction, and also of the cost of maintaining all but minor roads . . . the stumpage for repurchase would be appraised by the Forest Service at frequent intervals on the basis of current operating costs and lumber prices with a reasonable margin for operating risks and profit—usually about 12½ per cent. Since it would be paid for only when and as cut, a relatively quick turn-over would be possible. . . . Repurchase might be either with the privilege of meeting the highest responsible bid, or without competition at the appraised value of the timber.[2]

THE SOCIAL ASPECT

The forest conservation dispute is basically one between present interest and future interests. It may well be more profitable for present owners to clear-cut now, and let the future go unconsidered. It may, at the same time, be of more value to society to forgo a few of the present benefits for the sake of maintaining a permanent resource.

In preparing this program for the redwoods I was struck with the way in which these differences spelled themselves out in terms of forest growth. In 1946 the Forest Service made a survey of the area. Under the cutting practices then prevalent, the annual growth rate was less than 200 board feet per acre per year. Good cutting standards would have produced something over 400 board feet of growth per acre per year. "Intensive management" would, after a period of time, have produced over 1,000 board feet of growth each year. Perhaps cutting practices have improved a little since then, but this discrepancy between the actual and the potential is too wide to be made up easily. The difference in the future, when even larger numbers of people will be demanding more lumber at reasonable prices, will obviously be large.

---

[2] *An Action Program for the Redwood Forests,* pp. 16–17.

It would seem possible to make an estimate of the social cost of allowing a growth of only 200 board feet a year when five times as much could be obtained in the future by some present decrease in cutting, and by very active reforestation. Our schools of forestry ought to have done this for us long ago. Present profits are presumably reinvested in other properties and so aid our economic progress in other ways, but they are not invested in tree-growing, which is a long process. There will always be substitutes for lumber, and demand at future high prices will, by definition, never be greater than the supply at those prices. But effective demand at much lower prices might be much larger. The difference to the future home buyers and other consumers between probable high prices and possible lower prices may well exceed any advantages to society from the present prices and profits of the lumber companies. The magnitude of the difference needs to be worked out in detail, but I believe that it will be an impressive amount. The advantages to the wood workers of having a steady occupation instead of a migratory one, and the advantages to the communities in the areas from a continuing resource, are much clearer, and quite large.

What good forest practices can mean to the wood workers and to the communities in the forest area can readily be seen through a few figures. Each 12,000 board feet of lumber supports one person for a year. With a present average growth of only 150 board feet an acre, it will take about 80 acres to keep one person at work. Under the "good forest practices" of the Forest Service, it would take only 27 acres. Under the "intensive management practices" which involve cultivation and reforestation, it would take only 12 acres to keep each man employed a full year. To put it another way, present growth rates on one acre will support one worker for a little over half a day. Under intensive management that acre will give him eight times as much work—four days. I am particularly interested in trying to prevent any new migratory labor problems in the California forests because California already has enough of them in its food crops.

What California is apparently going to experience is what the East and Southeast have already experienced in regard to overcutting and lack of reforestation. In periods of very high prices the temptation to overcut seems irresistible, and in periods of low prices there are no funds for reforestation, and many lessees feel that they must cut more ruthlessly than before in order to maximize their income. I have a great deal of sympathy for their problems, but it does seem that the social costs of their operations should not be borne by the innocent bystanders in the form of the wood workers, the communities and the younger generation of the area, and the general taxpayers. A regular, steady lumber industry, cutting in accordance with good practices and with a reasonable share of its revenue devoted regularly to reforestation, would render more of a service to the state and the nation than one which, for presumably good and generally sufficient reasons, lets the future take care of itself. That simply means shifting a whole series of burdens to the community.

The lumbering companies of California, I am certain, would make more money over a sixty-year period by welcoming and accepting the intensive forest management which has been proposed than they will by objecting to it and going on as they are at present. And if the stockholders of those companies want funds to pass on to their children, they would probably get more after taxes for that purpose under my proposal than they will get under the present practices.

THE ECONOMIC ASPECT

The proposal for operation of the redwoods by the United States Forest Service under the auspices of a National Redwood Forest Corporation was based on fairly low stumpage values, increasing annually at the rate of 1½ per cent. The starting figures were $6.35 per thousand board feet for redwood and $4.52 for white wood. On that basis the whole job of replanting, cultivating, and protecting would have been undertaken, with revenues sufficient to pay off the $125 million loan from the RFC and the compounded interest within sixty years. An annual cut of no more than 470 million board feet of redwood and 33 million board feet of white wood was assumed, in order to allow for re-establishing the forest. At the end of a sixty-year period the cut could be much larger, and at the end of 120 years it could be almost doubled.

In the three years since that proposal was made, lumber values have increased so much (about 17 per cent at the mills) that the cultivation and reforestation work could have been stepped up and the whole loan could have been repaid in a much shorter time, or a somewhat higher price could have been paid for the timber and a larger loan could have been repaid within sixty years.

A few figures from the pay-out estimate may be of interest. The accompanying table shows for a few selected years the total revenues from lumber sales, the salvage of minor species, and grazing rights, in Column 2. The total costs include administration, road construction, maintenance, planting and cultural costs, interest charges, and the sum of one million dollars annually paid in lieu of taxes to the state for the benefit of the forest counties. They are grouped in Column 3. The net revenue available for amortization is given in Column 4. (In this model, interest payments were postponable for the first ten years.) The last column on the right shows the unretired portion of the forest loan, originally $125 million, at the end of each of the years given.

TABLE 1—ESTIMATES OF OPERATION

1 Year of Operation	2 Total Revenues	3 Total Costs	4 Net for Amortization	5 Unretired Forest Investment
1	$4,596,430	$3,250,000	$1,346,430	$123,653,570
20	6,294,350	6,201,980	92,370	111,907,050
40	8,266,060	4,833,670	3,432,390	74,419,710
60	11,121,120	3,082,000	8,039,120	0

By the time the loan was repaid, the state and the nation would have had an investment worth over $320 million (including the improvements) at no cost to the two governments, and with a net annual revenue of $8 million to be divided equally between them, together with a far larger supply of reasonably priced lumber for the consumers, steady incomes for the wood workers, and a sound and continuous financial stability for the communities in the area.

THE NEGATIVE SIDE

It is important to attempt to understand why this proposal was not accepted when it was made. First, there was no national conservation or other group to press it on the attention of Congress. The country's policies seem to be affected more by contending producer groups than by consumer groups, and Congress does not yet see its own function as that of protector of the general welfare of the otherwise unrepresented consumers. Second, there was no fiscal mechanism for the loan that had ever been used in quite this way before. The RFC has frequently loaned sums to mines and factories, but the practice of loaning to a national agency for conservation purposes was less common. Third, and most important, the lumber interests of the area were unwilling to forgo their opportunities for maximum short-term profits and to take their chances on contracts for regular cutting over a long period. The opposition was pronounced in spite of the provision that present timberland owners could be given the right to repurchase specified amounts of timber over the years, and stay in business. Perhaps a final explanation is that conservation has been mixed up in the public mind—and perhaps not by accident—with too much government.

One other argument was offered by some, namely, the fact that California now has a state forest law which presumes to regulate forest practices on private land. But nothing done under that law offers any hope that the redwood forest of California will be managed on a sustained-yield basis. Nor will the rapidly increasing population be provided with sufficient recreational areas that way. Simply to preserve some "forest museums" of these remarkable trees is a poor legacy to hand to the generations which follow us.

The government's expenditures for resources are on a year-by-year basis, with a host of claimant agencies contesting for the sums that are available. Actually, it is quite absurd for the United States to act as if public investment in resources were only a maintenance charge, to come out of the current annual appropriations. No business concern would put an acquisition of major assets under the head of operating expenses, to be paid for out of the year's current revenues. The odd part of this practice is that the United States treats its investments in foreign resources quite differently. It authorizes the Export-Import Bank to lend sums abroad up to a certain amount. The Bank then makes a series of loans. But none of these loans shows up in the annual budget, because they will be repaid. Wherever necessary public loans in soil or forest conservation in our own country can be repaid, it would seem reasonable to put them in the same class as our investments in foreign resources. If that were done as a matter of common practice, Congress might have been more ready to authorize this proposal.

But even more important than this revision of our accounting and budgeting system is the need for some more thorough national questioning about the whole idea of letting the forest resource owners carry on as if they had a responsibility only to their stockholders, and none to the communities where they operate. Practically all the American petroleum companies operating abroad have accepted a certain degree of responsibility to the nations whose resources they are extracting. They are helping them to build up the living standards of the people, to industrialize, to get better housing, to learn new farming and health techniques. Is it asking too much for our logging companies to accept some degree of responsibility for the future of the American communities whose resources they are extracting, and whose future they are unmaking?

Dewey Anderson, Ph.D., Washington, D. C., is executive director of Public Affairs Institute, and former codirector (with Percey E. Davidson) of the Institute of Occupational Research, Stanford University He has engaged in numerous activities in the field of economics in connection with governmental agencies, and is author or co-author of many books, of which the latest is An Action Program for the Redwood Forests (1949).

Forest Policy for the Years Ahead

By Hardy L. Shirley

THE observant traveler journeying across our eastern and southern states is impressed with the large amount of potentially productive land that is little used or completely idle. Fallow fields, brushy pastures, abandoned farms, and some heavily eroded lands meet the eye. Much land that has never been cleared for farming likewise lies virtually idle in terms of potential productivity. Pine lands cut and burned in the Lake States furnish one example. Cutover woodlands in which decadent and cull trees occupy 80 per cent of the growing space provide another. Idle land best suited to forests is estimated to total 60 million acres.

Neglected land has its counterpart in neglected farm homes, shabby villages, idle factories, and the unsightly no man's land that surrounds our cities, producing only signboards, dumps, and huts of the scavengers.

To the European, accustomed to well-kept farms, forests, and villages, these neglected acres suggest crass waste. He might with clear conscience say, Open the gates of your idle acres to the homeless of other lands that they may use the good soil to stay hunger and want.

Yes, idle land is a symbol of waste. It is a symbol of overoptimism, of hasty development and slow disillusionment. Yet what measures can we use to control it?

Remedial Measures

Some would impose drastic regulations to prevent exhaustion of our basic resources of soil, forests, and water. Others just as earnestly would invoke drastic restrictions on government expansion lest precious individual rights be irretrievably lost.

Can we find a middle way? We can; in fact, we have found it. Case histories of trends in agriculture show the way. In New York State careful records kept over the years by farmers on both good and poor land have been intensively studied by experts in farm management. Farmers on good land were found to become progressively more prosperous; those on poor land, progressively more poverty ridden. Every improvement in genetic strain of crop or livestock, every refinement in soil management, but magnified the advantage of farming good land rather than poor land.

The over-all result of applied agricultural science, therefore, was to favor enormously the farmer on good land and to discourage his neighbor on the hill farm. Abandonment resulted. This encouraged land speculators, who sold land acquired at little cost to inexperienced farmers. Average tenure on such lands dropped to five years or less. Meanwhile, the savings of a lifetime might be dissipated.

To stop this evil, land classification based on the capacity of the land to support a family practicing good farming was begun. This was supplemented by state purchase of submarginal farms and returning them to forests. County agricultural agents and local bankers advised prospective farmers against purchasing poor land. Attractive wages in nearby factories drew others out of farming. Wise management of these land resources was attained without drastic regulation, loss of owners' rights, or granting undue power to governmnet.

WORLD OUTLOOK

In a world where half the people are poorly fed and housed, needless waste of resources is viewed as a sin against mankind. Superabundance for a few, alongside want for the many, creates vast human unrest. Years of international tension seem to lie ahead. To ignore the consequences of such a state on domestic forest policy today is as unrealistic as to ignore atomic weapons. Leaders in other lands are demanding much in addition to food—shelter, fuel, books, education, and industries. Forest products are next to food in importance.

World forests are vast. They cover 9.5 billion acres, of which only one-half have been tapped for commercial use. However, unexploited forests are remote, contain trees of many species and unknown properties, and are mostly hardwoods. Available chiefly only from North America, Europe, and Siberia, softwoods today make up 85 per cent of total lumber demand. The densely populated Mediterranean and Far Eastern countries are mostly without adequate wood supplies. Consumption of wood in these countries is as low as 2 cubic feet per capita yearly, as contrasted with 28 in Europe and 75 in the United States. Since little prospect exists for quickly developing the untouched forest, and requirements of local populations expand about as rapidly as transportation opens these lands, the United States can expect to obtain little wood to augment our own supply or to fill needs of deficit countries.

The United States has a twofold obligation in world forestry. We should manage our own forests well to set an example before other nations. This would mean growing timber to meet our own needs, with some surplus for export.

We should assist others to develop the full potentialities of their forest land. Aid to others can be most effective and cheap if it is concentrated on efforts to spread technical information and the desire to use it. Suggested methods of accomplishing this are graduate instruction and study tours in the United States, help to establish technical schools, research centers, and extension services in other lands, and promotion of international trade. To default on these obligations is to invite rival nations to provide the service and to reap the good will that results from such co-operation.

NEED OF FORESTS AT HOME

Our country by 1960 assuredly will contain 170 million souls and by the year 2000 in excess of 250 millions. Such a population is vastly in excess of the 180 million forecast used in the United States Forest Service wood requirements studies. Another article in this series will deal in greater detail with domestic requirements. Suffice it to say here that little prospect exists of substantial and long-continued decline in requirements, in view of population growth, mobility of workers, high defense requirements, and the needs of other countries.

Wood has always occupied an important place in the national economy. As of 1947 the lumber and lumber products industries ranked tenth in national employment, with 636,000 workers. These created values of 2.5 billion dollars. The paper industry ranked eleventh in the values added by manufacture. Wood as a basic raw material for other fiber-producing industries and plastics industries seems destined to grow in importance in the years ahead.

Our country greatly needs the many additional services of forest land. Water becomes more precious year by year, floods more disastrous. Increasing dependence on an industrial economy multiplies the need for outdoor recreation in natural settings. Forests protect watersheds, afford recreation for man, and provide homes for useful wildlife. Forests represent the best commercial use of over 25 per cent of the land area of the United States. On an additional 8 per cent of our land area, forests serve as the most useful vegetation even though no timber is harvested.

PRESENT PROGRAMS IN FORESTRY

Our country has impressive forestry programs currently in operation. They include some 115 million acres in federal, state, county, and community forests, managed with timber production as a major objective. To this should be added nontimber-producing lands in national, state, and local parks, and noncommercial forest land included within the boundaries of national and state forests. Pulp and paper, lumber, and other forest products industries have industrial forestry programs some of which match those of public agencies in intensity. Public effort through the Cooperative Forest Management Act, and private effort through the tree farm and other movements, are carrying the management of forests to small holdings. Co-operative control of fires and disease and insect outbreaks is being rapidly expanded. Research in forestry has moved at a rapid pace.

Equally significant have been advances in logging equipment, and in milling, processing, and wood fabrication.

Progress in forest management during the past decade has been little short of phenomenal, especially in industrial forestry. Foresters employed by private business have increased from about 700 to some 4,400. Changes in attitudes and policies match the growth in industrial foresters. Still we are barely started on the huge tasks that lie ahead.

Present forestry programs fall short in the following specific instances:

Large areas of forest land are still unprotected against fire.

Losses from destructive insects and tree diseases substantially exceed those caused annually by fire.

Saw-timber growing stock still appears to be declining at the rate of 1⅛ per cent annually.

Clear-cutting immature timber, wasteful of both wood and growing space, still exists in most states.

The timber-growing potentials of the national forests are only partially realized through timber harvest.

Some 60 million acres of land best suited to forests remain today understocked or denuded. Planting programs are decades behind need.

The economic problems involved in small land ownerships have still to be clearly defined and solved.

Logging and lumber manufacture lag behind other industries in increasing output of labor and in reducing accident rates.

Lumber prices in recent years have increased at a far more rapid rate than prices of other manufactured commodities.

Floods and periods of low water supply plague many areas of our country.

RECENT PROPOSALS

Following exhaustive studies of forest resources and national requirements by both the United States Forest Service and the American Forestry Association, a Forestry Congress met in Washington in 1946. The *Proceedings* of the congress contains the best modern résumé of thinking on the question.[1] Other significant writings are those of

---

[1] American Forestry Association, *Proceedings of American Forestry Congress,* Washington, D. C., 1946.

Graves,[2] Pinchot,[3] Winters,[4] Greeley,[5] Raushenbush,[6] Gulick,[7] and members of the United States Forest Service.[8]

An analysis of these various proposals would be out of place in this article. Much ground in common exists, and some sharp differences.

Proposals generally supported

Agreement is general that more adequate protection should be provided forests against fire, insects, and diseases.

Those lands that are needed for public recreation or for critical watershed protection, and lands that are so poor in quality that they cannot yield sufficient forest products to justify private ownership, should be largely in public ownership.

Taxes on forest land should be neither confiscatory nor so low that the forest fails to contribute its fair share toward support of government.

States having forests should support a competent organization to protect lands from fire and manage state forests.

Research programs should be carried forward vigorously on all major forestry fronts.

Insurance to protect forest landowners against crippling losses from fire, insects, and diseases should be provided.

Barren lands unsuited to other uses but capable of supporting commercial forest crops should be planted to trees.

The national forests should be managed so as to produce to their full capacity timber to support the national economy. Other public forests should be managed likewise. Industry, landowners, government, and labor should co-operate in managing all forest land so that the social benefits to mankind are maximized. This includes use of forests for recreation, wildlife, and water and soil protection. It also implies management to stabilize employment, and forest communities dependent thereon.

Controversial issues

Sharp differences in opinion exist among representatives of government, industry, and labor over the extent and types of aids to private owners, the extent of public ownership of forests, and public regulation of private forest practice. The forest industries are opposed to the generous extension of public credit, believing that this will lead to supporting uneconomic holdings and inefficient management. Credit, they feel, should be handled through private channels. Government as represented by the United States Forest Service has favored public credit on a fiscally sound basis and has favored distribution of planting stock to farmers at nominal cost, but has not advocated direct benefit payments for forest improvement practices. Organized labor has advocated extensive benefit payments to landowners and timber operators for forest improvements, safety measures, and practice of good forestry.

The United States Forest Service wishes public ownership extended to block up holdings within existing national forests. It also advocates acquiring lands of low productivity by the public. The forest industries are willing to exchange land within national forests to block up federal holdings, but ask also that some federal lands be relinquished to block up private holdings.

---

[2] Henry S. Graves, *Problems and Progress in Forestry in the United States,* Washington, D. C.: Society of American Foresters, 1947.

[3] Gifford Pinchot, *Breaking New Ground,* New York: Harcourt, Brace & Co., 1947.

[4] Robert K. Winters (Ed.), *Fifty Years of Forestry in the U. S. A.,* Washington, D. C.: Society of American Foresters, 1950.

[5] William B. Greeley, *Forests and Men,* Garden City, L. I.: Doubleday & Co , 1951.

[6] Stephen Raushenbush, *Our Conservation Job,* Washington, D. C.: Public Affairs Institute, Report No. 4, 1949.

[7] Luther Halsey Gulick, *American Forest Policy,* New York: Duell, Sloan and Pearce, 1951.

[8] U. S. Dept. Agriculture, Forest Service, *Trees, The Yearbook of Agriculture,* 944 pp., 1949.

The Forest Service advocates public regulation of private forest practice by states. In states that fail to act within reasonable time, the Forest Service favors direct federal action. The forest industries favor regulation at the state level only where this is demonstrated to be needed. Organized labor has favored regulation strictly at the federal level, which would provide that no timber be cut unless designated for cutting by an officer of the United States Forest Service or a forester licensed by this Service.

NEW APPROACH NEEDED

The writer feels that the proposals discussed fall short of future needs in several respects:

1. Future United States and world populations have been underestimated.
2. Obligations of the United States as a leader in world political and economic affairs have been minimized or ignored.
3. No nation-wide classification of forest land based on uses and productivity has been proposed carrying a program for each land class.
4. No proposal deals effectively with the complex problems confronting the holders of small forest properties.
5. Proposals for regulating private forestry practice provide inadequate landowner representation, and are restrictive rather than constructive in nature.

In the following sections the writer sketches his own thoughts on forest policy. They are based on his conviction that United States industries in the years ahead will provide a good market for all the timber we can grow economically.

CLASSIFICATION OF FOREST LANDS

Forest policy can best be formulated and administered by relating it to the following classes of forests: (1) protection forests; (2) recreation forests; (3) commercial forests: (*a*) suited for intensive private management, (*b*) suited for extensive private management, (*c*) uneconomic for private management.

1. *Protection forests*

Steep slopes, municipal watersheds, and flood-producing areas are classes of lands that require the protective effect of forests to retard erosion, to hasten infiltration of water into the soil, and to impede surface runoff. Protection forests should be given the most careful handling. This will require public ownership of the most critical, and for other lands, restrictions on cutting. Because abuse of protection forests may cause disastrous public losses, these should be the first to be placed under a form of public regulation.

2. *Recreation forests*

Second only in priority to soil and water protection are forests for recreation. Lands needed for public parks, parkways, and scenic monuments should be set aside in generous amounts. Most should be in public ownership with timber use excluded or restricted so as not to interfere with recreational use. Timber harvesting on many lands can be conducted so as to enhance recreational values by opening vistas, improving food and cover for wildlife, increasing accessibility, and creating variety in otherwise unbroken forests. Private forest lands having high value for public recreation may in some cases require special treatment. The public might very well consider offering the owners inducements to open such lands to public use.

3. *Commercial forest lands*

Commercial forest lands are those capable of producing harvestable crops of timber and not required for higher uses conflicting with timber cutting.

(*a*) *Lands suited to intensive private management*

Lands supplied with a good transportation network, near timber markets, and capable of producing attractive financial returns from forestry, justify intensive management. Potential growth is such that merchantable harvests may be expected at intervals of thirty years or less. Few such lands support today timber stands of high value. In fact, it is these very lands that have been cut most frequently and heavily in the past. On many accessible forests, timber growing stock has been so badly depleted that intensive management will be unprofitable for decades. These fall in Class 3(c) below. Lands classified as suitable for intensive forestry should receive special consideration by government. It is from such lands that the bulk of the future wood supply for the nation must come. Forest practice on these well-located, high-producing lands should be in keeping with the potentialities of the land.

(*b*) *Lands suited to extensive private forestry*

Land remote from transportation, rugged in topography, with rock or poor soil, or otherwise difficult to operate, is suited only for extensive management. Merchantable cuts of timber can be had only at intervals of thirty years or more. Such land if taxed at a reasonable rate, as in the unorganized towns of Maine, may be a good investment for the private timberland owner. It can, however, support only limited expenses for forestry. Public regulation of practices should be mild. The land should be protected against fire. Public policy should encourage efforts on the part of the owners gradually to convert these lands, by means of roads and other practical measures, into land that can be handled intensively.

(*c*) *Forests uneconomic for private management*

Timber may be profitably harvested from many lands on which the stumpage value is below the cost of producing it. Lands may fall in this classification because they are remote, steep, rocky, arid, or swampy. They may also be uneconomic if overtaxed or if undersized. Lacking prospect for financial return, the bulk of such land should be managed by the public. However, small scattered holdings may prove unduly expensive to manage by government. Carefully administered public aids to private owners offer an alternative. Aids would be justified in the long run only if they enabled owners within a few decades to transform these lands from Class 3(c) to Class 3(a) or 3(b). Little can be done by the public to regulate forest practices on such lands without such requirements being tantamount to confiscation.

SPECIAL PROBLEMS ON SMALL FOREST PROPERTIES

Small forest properties owned by 3.1 million farmers and 1 million others in aggregate total 261 million acres. Practices on such lands as revealed by the Forest Service reappraisal study of 1945 are poorest of all. Present public measures grouped together are still insufficient to make timber growing economic on properties averaging only 63 acres in size unless these are an adjunct to some other use. Cull trees, low-value species, and small trees are common. Understocking is characteristic. Timber operators usually want to cut everything useful on such a property because of the high cost to them of purchasing and harvesting timber in small quantities. Co-operative marketing has occasionally helped such owners.

The best results on small ownerships have been attained in New Jersey, where it is stated that 50 per cent of the timber is cut under state supervision.

High productivity can be assured only by consolidating such land into economically sized management units. Public policy should encourage this. Neither state nor federal government can be expected to act as agent for over four million private owners.

A PATTERN FOR IMPROVING FOREST PRACTICE

Argument during the past eight years has centered not so much on the desirability of public regulation of forest practice as on what form regulation should take, and what agency should administer it. What really concerns owners is the fear that regulations will be imposed by men lacking firsthand experience in the economic difficulties of managing timberlands.

The proposal made here is similar to patterns that have worked successfully in Sweden, Finland, and Norway. It involves organizing each forested state into appropriate-sized forest districts. A forestry board made up of representatives selected by forest landowners and appointees of the state should serve each district. Their functions would include establishing forest practice standards, supervising the administration of public aids to forest owners, and reviewing the program and activities of district foresters.

Boards should emphasize positive measures to improve forest productivity, rather than punitive measures against delinquent owners. Such positive measures might include improved protectio against fire, insects, and diseases, ai in access road construction where thi would benefit several owners, improvement of marketing information an services, measures to stabilize local industry and employment, and perhap licensing or listing of forest operator who can be relied upon to do a satisfactory job of timber appraisal, logging custom sawing, tree planting, and acces road building.

Such boards should be given wide authority to promote activities that offe substantial promise of increasing th usefulness of forests. Integrated wood-using industries that encompass pulp lumber, veneer, and small dimensio manufacture are examples of opportunities to reduce waste and thereb improve potential returns to landowners.

Work of district boards should b subject to review by state forestr boards and a national forestry board Review should be in the nature of establishing national and state goals i timber production and distributing thes to districts, rather than restricting imaginative attack on local problems b individual district boards.

In addition, these citizens' board would be useful as advisory bodies t the federal and state forestry services Forest landowners should make up th majority representation on state an federal boards, with additional representation from forest labor, wood-usin industries, recreationists, and range an water users. Constant liaison betwee federal and state forest officers woul enable forestry boards to adjust thei programs to meet national needs.

SUMMARY

It has been possible herein only t sketch in bare outline some of the major issues involved in managing ou country's forest resources, and measures deemed helpful in meeting these.

Our forest policy should provide for a population far in excess of 180 millions. This level may be approached within a decade. Foreign obligations should be recognized and provided for, including assistance to other countries in developing their own forests. Generous reservations of park and other recreation lands should be made with appropriate restrictions on forest practice. Public concern should be especially directed to protecting soil and watersheds. Classification based on economic productivity should be recognized as essential for guiding practice on both public and private lands.

Public control over private forest practice should be democratically administered, with forest landowners themselves having majority representation on policy boards. Government control over forestry should be directed toward meeting positive goals rather than setting minimum standards.

Hardy L. Shirley, Ph.D., Syracuse, New York, is acting dean of the State University of New York, College of Forestry at Syracuse. Prior to coming to Syracuse in 1945, he served sixteen years in the United States Forest Service at the Lake States and Northeastern Forest Experiment Stations, and was director of the latter station from 1939 to 1945. He has published widely in the fields of silviculture, forest economics, and forest policy, and is author of a forthcoming book entitled Forestry and Its Career Opportunities.

Soil Conservation and the Maintenance of Soil Productivity

By Richard Bradfield

According to the basic laws of conservation, matter and energy can neither be created nor destroyed. These principles apply to the material of which soils are made, as well as to the rest of the earth. The soil, as an individual entity, can be destroyed partly or completely. The matter in it can be transformed into a myriad different compounds and dispersed throughout the globe, but it cannot be destroyed. It will still exist somewhere and be available at some time for use in another soil building cycle.

The general public has been greatly confused by the widespread difference in views which have been appearing in the public press and in popular books and magazines in the last decade, regarding the status of the productivity of the soils of the United States and of the rest of the world. This is a very vital matter, and the thinking person should be concerned. What is the truth? Which of these conflicting views is correct—the pessimistic view expressed so eloquently by Bennett, Vogt, Osborn, and others, or the more optimistic view frequently expounded by Salter, Kellogg, Sir John Russell, and others?

As is the case in most controversies between optimists and pessimists, there is a considerable body of basic truth available to support either point of view. This is certainly true with respect to the highly divergent views regarding soil conservation. People tend to see what they want to see. They see not only with their eyes but through their specialized training and past experiences as well. Soils men are becoming more and more highly specialized. The vast accumulation of data of all sorts dealing with soils makes this necessary. We have soil physicists, soil chemists, soil microbiologists, soil fertility specialists, soil morphologists, soil conservationists, et cetera.

It is just as natural for soil scientists in these various specialized fields to reach different conclusions as to the status of our soils as it is for independent medical specialists to differ in their diagnosis of a patient's illness. No one man has at his disposal all the basic information necessary for an accurate judgment of the potentialities of the soils of the United States. The answer that one gets when one speculates on this question depends on the assumptions he makes with respect to a whole host of contributing factors.

Agricultural Experiments

From the dawn of soil science, all specialists in these fields have been more or less interested in maintaining and increasing the productivity of the soil. The first agricultural experiment station at Rothamsted in England set up experiments in 1843 to measure the effect of the soil treatments which were known and feasible at that time upon the long-time productivity of the soil. At that time, chemical fertilizers were just being introduced, and the founder of this station, Sir John Lawes, was interested in finding out whether these new chemical fertilizers would maintain the productivity of the soil over a long period of time as effectively as the well-known barnyard manure. These experiments have been continued ever since that time. The answer which they have given is quite clear cut. Crop yields have been maintained for over a century, even with continuous culture of wheat, with both chemical fertilizers and farm manure.

When the state experiment stations were set up in this country, most of them shortly after the close of the Civil War, similar experiments designed to measure the effects of different cropping systems and different soil treatments upon the long-time productivity of the soil were started, and in a few cases these original experiments are still being continued.

The oldest of these, the Morrow plots at the University of Illinois, are now over seventy years old and show quite conclusively that systems of management known at the time these experiments were started and now widely practiced throughout the corn belt are not only maintaining but even increasing the productivity of that originally exceedingly fertile Illinois land. As a matter of fact, the plots which have been growing a rotation of corn, oats, and clover for this entire period, with modest applications of farmyard manure, lime, and superphosphate, have in recent years been producing yields of crops which are about 32 per cent larger than the yields obtained when these experiments were started. Similar experiments are located on Sanborn field in Columbia, Missouri, and the Jordan plots at State College, Pennsylvania.

Early in this century, Cyril G. Hopkins, of the University of Illinois, published a book entitled *Soil Fertility and Permanent Agriculture.* Director C. E. Thorne of the Ohio Agricultural Experiment Station published a series of bulletins about the same time on the maintenance of the productivity of soils, with special emphasis on Ohio conditions. All this early work was based on field experiments, and the criterion used for determining what was happening to the soils was the yield of crops obtained each year over a long period of time. These early leaders were working in a general farming area, in which considerable livestock was raised, in which good crop rotations were widely followed, and in which the soil, in general, was protected physically and rendered inactive biologically by long, cold winters. It is clear, then, that soil scientists have from the beginning been concerned with the problem of maintaining the productivity of soils.

EMPHASIS ON EROSION

In the South, the situation was different. Farmers were following a one-crop system, with a high percentage of their land in row crops such as corn and cotton. The rainfall was heavier than in the North. Because of the more open winters, the soil was not so well protected against erosion nor so inactive biologically as in the North. Hugh Bennett, founder of the Soil Conservation Service, was a native of North Carolina and spent much of his professional career in the South. This was the type of agriculture with which he was most familiar and in which he was most interested. To his practiced eye, the effects of erosion were obvious and devastating. He succeeded in persuading President Roosevelt to establish a special Soil Erosion Service in the Department of the Interior in 1933. This later developed into the Soil Conservation Service of the Department of Agriculture. It was given the mandate to stop soil erosion.

Bennett was a crusader. Every type of evidence that he or his employees could find of soil moving off a field or from one part of a field to another was measured, photographed, and dramatized. By comparing the depth of certain characteristic layers or features in the cross section or profile of virgin soils in woods or fence rows with the depth of these same features in fields which had been cultivated for a long time, it was possible to estimate roughly the amount of topsoil which had been lost by sheet erosion. By the use of such criteria, land under cultivation in most of the United States was quickly surveyed and mapped and estimates were made of the amount of topsoil lost from the arable land in the United States by erosion.

DIVERGENT VIEWS

As an outgrowth of these developments, the men working on soils in the United States have, in the last twenty years, tended to be divided into two groups. First are those interested primarily in the physical losses of topsoil by erosion and in means of preventing further losses. This group is largely affiliated either officially or ideologically with the Soil Conservation Service. Second are those interested primarily in developing the best possible methods for managing the soils which we have left, their potentialities under good management, and so forth. This group is made up largely of the soil scientists in the state agricultural colleges and experiment stations and in the Bureau of Plant Industry, Soils, and Agricultural Engineering (until recently Robert M. Salter was chief of this Bureau) of the United States Department of Agriculture. We have, then, two fairly large groups of soil specialists, supported largely with public funds, either state or federal, and both interested in better soil management.

It soon became evident that while the innovations emphasized by the Soil Conservation Service for preventing erosion (terracing, strip cropping, diversion ditches) were very helpful, they needed to be combined with the best of the conventional agronomic practices. But this area of activity had already been pre-empted by the older Bureau of Plant Industry, Soils, and Agricultural Engineering in the Department of Agricultural and the state agricultural experiment stations and colleges. Any effort made to apply such a well-balanced system of soil management obviously led to overlapping activities, controversies, and competition for funds between the various agencies, and aggravated the need of each for data for dramatizing the situation. The net result is that many thinking people on the side lines have been confused. This is all a part, possibly an essential part, of the democratic process.

Erosion control is a very important phase of soil conservation in most areas; in certain areas, unquestionably the most important phase. There is no question that, in the broadest sense, it was being neglected and is still being neglected in many areas. In a period of about two decades, largely as a result of the energetic leadership and evangelistic fervor of H. H. Bennett, the country has been made erosion and soil conservation conscious. The colleges of agriculture in many states have added specialists in soil conservation to their staffs and are offering courses in soil conservation to their students.

When he asked me to prepare this paper, the editor wished "a disinterested judgment on the merits of the controversy between the Soil Conservation Service which argues that we must restore vast areas, and the Salter-Kellogg group which seems to argue that increasing productivity will see us through fairly well." In the meantime, Hugh Bennett, chief of the Soil Conservation Service, has reached retirement age, and Robert M. Salter, then chief of the Bureau of Plant Industry, has been named as his successor.

This point is significant. It does not detract one iota from the epoch-making services of H. H. Bennett. It indicates merely that his most important job, making the United States and the world more conscious of the evils of soil erosion, has been superbly done, but that it is now time for all concerned to bury their hatchets and devote all their energies to the development of carefully integrated, well-balanced systems of soil management in which erosion control receives its due share of attention.

SOIL BUILDING AND DEPLETION

All the above is cited to give the general reader some background which I think is factual for understanding some of the confusing and at times apparently conflicting statements made in the public press and in popular magazines and books. Let us now approach our subject from the standpoint of the best basic scientific evidence available to us. Let us consider first the nature of soils, how they are formed, how and why they deteriorate under cultivation, and how this deterioration can be prevented.

The soil is not a dead, static storehouse with a few inches of topsoil built up before agriculture started and incapable of being renewed. It is a living, dynamic system, in which constructive and destructive processes are constantly proceeding side by side. If all the vegetation produced is allowed to fall back on the soil, as it does under natural conditions, organic matter accumulates and fertility increases. As organic matter accumulates, the rate of its decomposition increases until a dynamic equilibrium is reached between soil building and soil depleting processes. When the soil is put under cultivation, the destructive processes are accelerated and the constructive processes retarded.

If a soil depleting cultivated crop like corn or wheat is grown continuously for long periods, without fertilization, yields will not drop to zero but will tend to reach a new equilibrium value which can be maintained for very long periods—for practical purposes, almost indefinitely. The yields of corn or wheat produced under such circumstances usually range from ten to twelve bushels per acre. This is what has happened in many old countries with dense population and an underdeveloped agriculture.

That course is, however, not the only one open to us. We can, in many cases at least, step up the soil building processes until they equal or even exceed the soil depleting processes. Proof that it can be done on a national scale is found in the history of agriculture of western Europe. The average yields of wheat in western Europe 150 years ago were close to this limiting value of 8 to 12 bushels per acre mentioned above. At the present time, they average from 30 to 40 bushels. Many regions in eastern United States which have been farmed for over 150 years supply equally convincing evidence that practical and economical ways have been found for building up the productivity of the soil far above the natural virgin levels existing when the white man came to America. It is worth noting, too, that this has been done by farmers without subsidies. In the early years it was done without the aid of the very great advances made in the agricultural sciences in the last quarter of a century.

PLANT NUTRIENTS

All the energy stored in our crop plants comes from the sun, and usually about 95 per cent of the dry matter in them is derived from air and water, leaving only about 5 per cent coming from the soil. This 5 per cent is made up of the elements contained in the ash of the crops, plus the nitrogen which is volatilized when crops are burned. The major ash constituents are calcium, magnesium, potassium, sulphur, and phosphorus. Several other elements are required by plants in very small quantities, usually only a few pounds per acre. These elements are copper, manganese, zinc, iron, boron, and molybdenum. They are usually referred to as the micronutrients because they are needed by crops in such small quantities. They are just as essential for the growth of the plant as the macronutrients. Practically all the water used by plants is absorbed by the soil through the plant roots. With most crops, between 300 and 800 pounds of water is required for every pound of dry matter produced. This calls for enormous quantities of water; and since our rains are often poorly distributed, it is important that the soil have sufficient storage capacity for water to meet the needs of the growing crop during the periods between rains.

The soil is, of course, also a storehouse for plant nutrients. An acre of soil one foot in depth usually weighs about four million pounds. Plant roots are usually able to exploit the nutrients in a soil to a depth of from two to five feet. Usually there is enough nitrogen and phosphorus in the top three feet of average soil of the humid region to meet the needs of from fifty to one hundred average crops, and enough potash for one thousand average crops. The size of the reserve in tropical soils or in very coarse sandy soils is of course not so large. Chemical analyses give us an accurate picture of the size of this stored reserve of plant nutrients. It was found quite early, however, that while chemical analyses gave a very useful picture of the magnitude of these stored reserves of plant nutrients, they often failed to give an accurate picture of the capacity of the soil to release these nutrients to the crop in a usable form. It was found, for example, that many very unproductive soils could not be distinguished from very productive ones by their chemical composition.

AVAILABILITY OF NUTRIENTS

We now know that this lack of agreement was due to the fact that these soils differed greatly in their ability to release their stored reserve of nutrients in a form which could be utilized by the growing crop. The rate of growth of the crop is not influenced by the magnitude of the stored reserves, but only by the amount of the various nutrients available for meeting the day-by-day needs of the crop. These needs, even in the case of the elements needed in largest amounts, seldom exceed two or three pounds per acre per day at the time the crop is growing most rapidly. It is very difficult and would be very expensive in most cases to make any great change in the magnitude of the reserves of fertility stored in the soil in a short period of time. On the other hand, it is very easy and often exceedingly profitable for the farmer to increase the supply of nutrients available for meeting the day-by-day needs of his crops. In the case of nitrogen, for example, he can do this by growing leguminous crops like clover which have the capacity to take nitrogen from the air and fix it in forms which can be made available to the succeeding crop by the action of soil micro-organisms. A crop of alfalfa can fix as much as 250 pounds of nitrogen per acre in one year—an amount that is more than sufficient to meet the needs of most nonleguminous crops for one year. As a matter of fact, when a crop like alfalfa is grown and the top used for hay, enough nitrogen is left in the ground in the form of roots to meet the requirements for many nonleguminous crops for one year. The farmer can also increase the supplv of available nutrients for his crops by the addition of crop residues, farm manures, and commercial fertilizers.

The extent to which each of the above techniques is used for maintaining the productivity of soil varies widely in different sections of the country, on different soil types, and with different types of farming. Livestock farming is ideal from the standpoint of soil maintenance, and as long as we are able to afford a livestock economy in this country, the maintenance of the productivity of our soils will not be a very difficult problem in most areas. To produce most types of livestock economically, large areas of leguminous forage crops are needed as a cheap source of high protein feed. Crop residues not fit for feed may be used for bedding the livestock and returned to the soil with the manure. Long-time experiments at Illinois and Ohio indicate that with a three-year rotation of corn, oats, and clover handled in this way and supplemented with very modest and inexpensive applications of ground limestone and superphosphate, yields of all crops involved can easily be maintained indefinitely at levels 30 to 40 per cent above the yields obtained on these soils seventy years ago. With more liberal fertilization, yields 50 per cent above those obtained seventy years ago can be consistently obtained with techniques now available.

In the potato and truck crop areas of eastern United States, applications of commercial fertilizer are used instead of farm manures. The soils in these areas are increasing in their content of phosphorus (see Table 1) and potassium, and are holding their own fairly well in nitrogen. The yields of practically all these crops in all these areas have been larger in the last ten years than ever before in history. There is little reason for feeling that their productivity is declining.

The citrus and vegetable production of Florida is based almost exclusively upon hand-to-mouth feeding of the crops with commercial fertilizers. Many of the soils used for producing these crops contain 95 per cent or more of sand. Farmers find it highly profitable to buy practically all the plant nutrients they need in the form of commercial fertilizer. As a matter of fact, they have been buying from five to ten times as much phosphorus as their crops have removed.

INCREASES IN YIELDS

For many years, the South has been referred to as Economic Problem No. 1. This is due in part to the one-crop cotton system of farming which has predominated the agriculture of much of the area. This era is rapidly drawing to a close as improved techniques for producing cotton are adopted. Several states have reported that they are now producing as much cotton as they ever did, on half of the land that they used twenty-five years ago. This frees half of the former cotton acreage in these areas for the production of forage crops and the development of a livestock industry. Dairying and other forms of livestock production are expanding rapidly. With this change in type of farming, there is little question that the agriculture of the South will soon be on a much more profitable and permanent basis. It would be hard to find a pessimist on the future of agriculture in the South among the agronomists of that region.

A careful study of crop yields for sixteen of our principal seed crops by Pearson, Myers, and Doak[1] indicates that the yields increased an average of 27 per cent during the period 1937–48. This was an unparalleled increase. During the same period, yields of vegetables increased on the average 2,100 pounds per acre, a greater increase than had taken place in the preceding half-century. Heavy fertilization undoubtedly played an important role in both cases. During this period the use of commercial fertilizers more than doubled.

---

[1] *Farm Economics*, Cornell University, March 1949, pp. 4290–4304.

TABLE 1—RELATION BETWEEN CROP REMOVAL OF PHOSPHORIC ACID AND ITS REPLACEMENT IN FERTILIZERS

States	Tons P_2O_5 in harvested crops in 1943[a]	Tons P_2O_5 in fertilizers consumed 1942–43[b]	Percentage removal replaced in fertilizers
Maine	6,544	24,370	372
Rhode Island	272	1,773	652
Connecticut	2,177	7,593	349
New York	35,267	69,944	198
New Jersey	4,307	23,630	549
Virginia	16,831	67,985	404
North Carolina	25,725	110,619	430
South Carolina	15,183	61,865	407
Georgia	26,554	110,347	416
Florida	5,454	47,086	863
Alabama	22,550	80,762	358
Tennessee	27,894	55,392	199
Ohio	69,334	69,267	100
Kentucky	26,729	61,989	231
Iowa	175,883	10,443	6
Missouri	58,104	27,059	47
North Dakota	85,678	899	1
Nebraska	83,259	696	0.8
Kansas	91,578	8,085	9
Montana	39,765	2,098	5
California	50,247	23,798	47
United States	1,699,064	1,258,857[b]	74

[a] The figures are for P_2O_5 contained only in the portions of harvested crops that are usually removed from the land. They do not include pastures.

[b] Includes 275,636 tons of P_2O_5 in fertilizers distributed by government agencies, a considerable portion of which was applied to pastures. Does not include approximately 500,000 tons of P_2O_5 applied to the soil in the form of barnyard manure.

Source: R. W. Cummings, Soil Science Society of America *Proceedings*, 10:241, 1945.

EFFECTS OF HIGHER YIELDS

This raises a question which is often asked. Do not higher yields per acre deplete soils more rapidly? In one sense, the answer is Yes. A 100-bushel crop of corn, for example, will take more from the soil than a 25-bushel crop. But it will not take four times as much, and *therefore not as much per bushel.* In another sense and from a long-time point of view, a much more important sense, the answer is emphatically No. The reason is that when we raise 100 bushels of corn instead of 25 on one acre, we free three acres for growing other crops; and if soil-building leguminous sod crops are grown on one or preferably two of the remaining three acres, the soil will be in better condition for future crop production.

Heavier fertilization results not only in larger crops but also in larger residues of fertilizer in the soil. If we calculate the amount of phosphoric acid removed in harvested crops in the states east of the Mississippi River, we find that the amount is often much less than is returned to the soil in the form of commercial fertilizer. Table 1 gives a summary of such data prepared by Cummings.[2] One needs to bear in mind when examining this table that it does not include the 500,000 tons of phosphorus returned to the soil in the form of barnyard manure each year. Since this table was prepared, the consumption of phosphate fertilizers in the United States has increased to over two million tons.

While the reserves of organic matter and of the nitrogen in it have undoubtedly been depleted in many sections of the United States, the fact that yields are increasing indicates that farmers are finding ways of meeting the day-by-day requirements of their crops for nitrogen by other techniques. With the increased production of improved leguminous forage crops already under way in many sections of the country and with the increase in the livestock industry in the South, the rate of loss of soil organic matter should be easily reduced. Our synthetic nitrogen fertilizer production has increased from practically zero at the close of World War I to almost 2,000,000 tons. Plants now being planned will increase our total capacity to about 2,300,000 tons per year by 1955. There is every reason for thinking, then, that the supply of nitrogen available to our growing crops will be greater in a few years than it ever was before, and fortunately the supply of free nitrogen in the air is inexhaustible.

---

[2] Soil Science Society of America *Proceedings*, 10: 241, 1945.

In my opinion, we need not be very greatly alarmed about these losses in organic matter and nitrogen as long as crop yields are increasing. Higher yields per acre usually result in more efficient production, and more efficient production means cheaper food for the consumer, more profit for the producer, and, in general, larger residues of fertility left in the soil. The real time for alarm is when crop yields begin to decline consistently. No highly developed country has yet reached this stage, nor, in my opinion, is it likely to. The cost would be too great.

FUTURE PRODUCTION

Many have expressed concern in recent years about our future food production capacity. I feel confident that if our descendants a hundred years from now fail to produce enough food for themselves, it will be because they fail to make full use of the knowledge and materials which modern science has placed at their disposal. It will not be because of mistakes made prior to 1950 in managing our soils. There should be no problem in producing all the fruit, vegetables, potatoes, and cereals needed for our population a century hence, if it continues to grow at about 1 per cent a year. There should be but little difficulty in producing all the dairy and poultry products that we are likely to need under these same conditions. The most difficult problem will be to produce enough T-bone steaks to meet demands in times of great prosperity. While more difficult, when we consider the great potentialities for improving our vast areas of grasslands, even this goal seems attainable!

Richard Bradfield, Ph.D., D.Sc., Ithaca, New York, is professor of soil science and head of the Department of Agronomy at Cornell University. He was formerly associate professor of soil science at the University of Missouri and professor of soil science at Ohio State University. He is a member of the National Soil and Fertilizer Research Committee of the United States Department of Agriculture; of the Committee on Plant and Crop Ecology of the National Research Council; of the Agricultural Advisory Committee of the Rockefeller Foundation; of the Food and Agriculture Organization Committee on Agricultural Production; and of the Editorial Advisory Boards of the Journal of the American Society of Agronomy and of Soil Science. He is a past president of the Soil Science Society of America and of the American Society of Agronomy.

Comparative Costs of Restoration and Reclamation of Land

By PAUL B. SEARS *

ANY thorough analysis of land use and management is likely to reveal the existence of conflicting interests, as well as of purely technical problems. Nor is the situation simplified when such conflict involves, as it often does, more than bare economic advantage. In spite of the present rationalization of much farm practice, the typical operator lives with his land, and his feelings are correspondingly involved in anything that concerns it.

Land subject to restoration, or old land, has been under operation, usually tillage, is relatively near to long-established markets, represents a past investment of capital and labor, and frequently reflects the presence of traditional values. As part of an older political entity it is likely to be thoroughly taxed, but in return it usually has at hand an adequate system of public facilities to serve its occupants. Any expenditure of public funds represents a charge against these occupants.

The owner of old land may question the fairness of being obliged to pay for enterprises that create competition for him. On the question of broader benefits, such as power and flood control, he may wonder whether the benefit to him is in any proportion to his contribution. But while this objection may be tenable for special assessments, it is stilled—technically, at least—in the case of expenditures from blanket taxation, such as the federal income tax. It may be noted that while the seventeen irrigation states gain practically all the direct benefits from federal reclamation spending, in 1950 they paid only 17 per cent of income tax revenues.

Any clear analysis of the pattern of equities involved would have to go far beyond the limits of the present paper. To what extent is the need of reclaimed new lands a bona fide economic and social pressure? To what extent a manufactured one? To what extent do such reclaimed lands actually compete with old lands? To what extent do they represent a rational enrichment of important production? Assuming the need for greater national production requiring the investment of more capital, should this capital come from private savings or from (increased) taxation? These are some of the very important elements in the problem that we must leave untouched.

DEPLETION OF OLD LAND

The productive capacity of much old land has suffered considerably. Dr. Robert Salter stated in 1938 that in spite of enormous progress in many fields of agricultural science, the per acre yield of Ohio farms was being maintained with difficulty.[1] And the same scientist reported in 1948 that the greatly increased yields due to hybrid corn had not been obtained without a corresponding demand upon soil nutrients.[2]

---

* With the invaluable help of Robert D. Teeters and Susannah Coolidge.

[1] R. M. Salter, R. D. Lewis, and J. A. Slipher, *Our Heritage, the Soil,* Bulletin 175, Agricultural Extension Service, The Ohio State University, 1938.

[2] R. M. Salter, "New Horizons for Agriculture," address given at the Annual Convention

While much of this old land can most profitably be retired to uses other than farming,[3] the bulk of it can be restored to a good level of sustained production by suitable technical measures. As will be shown in the following discussion, the expense involved in this restoration can be met out of the resulting increased earnings. The experience of certain bankers shows that such rehabilitation can be satisfactorily handled through the ordinary channels of private credit.[4]

Besides this old land, there is in the United States an extensive area, estimated by the Soil Conservation Service in 1945 to be about 85 million acres, of now unoccupied land or land subject to extensive, low-grade use, some of which has proved very productive for fishing or trapping. To date these lands represent little if any investment, settlement, or improvement, although they can be made suitable for farming through clearing or drainage. Both operational and social facilities must be developed in the process of reclamation.

GOVERNMENT INVESTMENT

Unlike the earlier irrigation projects, a majority of which were privately financed, those now remaining must be underwritten by government funds. This money is contributed in part by all operators of old land, through taxation. Before 1940 the contribution of the Federal Government in this direction was deemed to be about one-quarter of the total output; but in the last decade the government proportion has greatly increased, and it will no doubt continue to do so. The remaining lands are naturally the more difficult and inaccessible ones; therefore ever larger investments will be required to build roads and bridges as well as the drainage and irrigation facilities. Then, too, this large investment will require provision for markets and other social institutions. In principle, all such expense is returnable to the Treasury from those who will own and operate the reclaimed land. However, their liability is minimized by the fact that cost of power, flood control, navigation, and other benefits is deducted from the cost of bringing new land into operation.

RECLAMATION OF NEW LAND

Estimates of the Twentieth Century Fund and the Army Engineers, representing both private and public sources, show that as much as 100 billion dollars would be required in the next generation to conserve and develop the country's renewable resources adequately. It is perhaps ironical for those interested in conservation to question the wisdom of measures designed to improve land use.

In a 1945 survey, the Soil Conservation Service estimated that there were 25 million acres which, when cleared

---

of the American Farm Bureau Federation, Atlantic City, N. J., 1948.

The amount of deterioration is difficult to determine, although Bennett's estimate of 50 million acres of cropland ruined for further practical cultivation, 50 million nearly so, and another 100 million acres with over half its soil gone deserves consideration. (Hugh H. Bennett, *Soil Conservation,* 1939, p. 7.) A fair criterion for the ordinary observer is the extent to which mixed legume-grass meadows are developed. Where the proportion on unspecialized farms falls below one field in four, efficiency of land use may be questioned. In 1950 the writer traveled over a thousand miles in Maine, where hay is a staple crop, and observed only four farms making effective use of lime and legumes. During the same season traverses of Ohio, Indiana, Illinois, and Iowa revealed fewer than one grass-legume field in twelve.

[3] I. Gregory Hines, "The Economics of Idle Resources," *Journal of Soil and Water Conservation,* Vol. 7, Jan. 1952, p. 27.

[4] *New England Farm Finance News,* Federal Reserve Bank of Boston, Vol. 6, No. 9, Sept. 1951.

and drained, would be suitable for regular cultivation, and over 15 million more acres that could be irrigated. In the decade from 1950 to 1960 it is probable that about 12.5 million acres actually will be developed as farmland —more than half to be expansion of existing farms and the rest to be created into new farms.[5]

The cost of such development is conjectural, and there is no clear basis for determining what the returns from this new land will be. Study of Bureau of Reclamation figures reveals little, because the projects involve much more than the development of land for cultivation, and it is difficult to separate the costs. At the end of the fiscal year 1950 the Bureau had spent $2,196,000,000 to render 5,657,037 acres irrigable, which amounts to $388 an acre including money spent on uncompleted projects and on power facilities. In 1947 it was estimated that those whose lands were being irrigated by the projects would pay back 33 cents on the dollar, the rest of the revenues being derived from power and miscellaneous sources; while nonreimbursible items would amount to approximately 5 cents on the dollar.[6]

Clearly, the power facilities are more than paying for themselves—in fact, are paying for some of the irrigation facilities. Therefore, while we have figures for the estimated improvement in dollars per irrigable acre, the judgment is not an intrinsic one. Rather it is an evaluation of how much the farmer is equipped to contribute to the expense of construction of the project. Economists have suggested that repayment schedules might be improved and that methods for determining the economic value of irrigation and drainage need revision; but even if this were done, costs would have to be separated to provide the people of this country with a clear picture.

Except for sporadic studies made in limited areas, no substantial data are available as to what the returns are from reclaimed lands and whether the costs are justified. While no insurmountable physical obstacles stand in the way of development of vast new acreages, the economic feasibility of such undertakings is uncertain.

Determining economic feasibility

Experience can be resorted to in some degree, however. In examining irrigation prospects, a distinction must be made between supplementary irrigation and irrigation of arid lands. In many areas rainfall is adequate but poorly distributed throughout the year, in which case irrigation provides some degree of insurance against drought hazards. Or where rainfall is low, yields may be increased by supplementary watering from irrigation facilities. These objectives can be differentiated from those which are concerned with making arid lands cultivable.

One method that has been used to determine whether or not an irrigation enterprise will be economically feasible is to classify the land to be irrigated by type and then to figure how many acres of each type a farmer would need to own in order to pay for irrigation facilities and meet the other expenses of his farm. In the Columbia Basin, a Joint Investigation Committee estimated that 33 per cent of the lands to be irrigated could be classified as the highest type, that 40 per cent was suitable for most crops, and that 27 per cent could be used for pasture. At prewar prices and excluding the cost of irrigation construction, a farmer could expect to make $60 per acre per year from Class I land, $35–$50 from Class II land, and $20–$30 from Class III land. To meet operating expenses, the committee concluded that a farmer in the Columbia Basin would need to own altogether at least 50 acres of Class I land, 55–80 acres of Class II land, and 160 acres of Class III land, a total of 265–290 acres.[7] Naturally, if he owned Class I and II land only, his acreage would be less; but if his land were Class III exclusively, his unit would have to be considerably greater. While the formation of such a scale is based on judgment, it can be of value, and illustrates the kind of planning and forethought which can facilitate decisions about irrigation undertakings.

---

[5] H. H. Wooten and Margaret R. Purcell, *Farm Land Development: Present and Future* (Washington: Department of Agriculture, 1949), p. 62.

[6] Computed from the 1950 Annual Report of the Secretary of the Interior.

Present work and plans

In 1948 it was estimated that 22 million acres of idle, fallow, and pasture land as well as cropland was being irrigated, which is over half of the acreage that it is believed would lend itself to this development. In 1947 a tentative plan of the Bureau of Reclamation envisaged increased irrigation of more than 10.5 million acres by 1957 at a cost of $560 an acre, or a total of $5,976,000,000.[8] The Bureau further expressed its goal of eventually irrigating almost 19 million acres for less than $500 an acre; but from the present trend in prices, there is no likelihood that costs will decrease as was seemingly expected.

This ambitious program is contemplated despite certain difficulties in the past. Five projects have been abandoned and written off at a total loss of over three million dollars, and seven others have presented serious difficulties. In one of its own publications the Bureau states that "the project never became fully settled and the landowners were not particularly interested in irrigation after it became available."[9] In the Missouri Basin, surveys have shown that the unevenness of the terrain, low ridges and mounds, and small depressions present problems in planning ditches, leveling the land, and spreading the water.

The vast majority of the great irrigation schemes are in the West. Land sales records in the late 1940's show that in that part of the country land that is in or near an area of projected irrigation has sold for $50–$100 an acre. When all the improvements of clearing, leveling, and ditching are completed, the investment may be $200–$300 per acre.

Returns from improved lands

In the Pacific States the high prices that have prevailed during and since World War II for fruit and other crops have justified the costs of irrigation. Profit on some of the new-land farms of the Southwest has been derived from cotton, for which there has been a high demand, although over the long run the cotton market is known to be very uneven. Irrigation is possible only when water supplies are available. In the past few years, favorable weather conditions have been a factor in the success of a number of projects. Moreover, commitments abroad and demands of the armed forces have made the last decade a period of unprecedented returns from high prices and expanded markets.

When new irrigation projects are contemplated, the long-time lag between appropriation of funds and actual yields from the improved land must be taken into account. Payment is not complete on any of the seventy-three projects undertaken by the Bureau of Reclamation in the western half of the United States since 1902, and has not started on some thirty projects.[10] Prevailing markets and prices are a questionable basis for evolving land development plans. Some estimate of probable future trends is essential in making a decision about present construction.

---

[7] Wooten and Purcell, *op. cit.* note 5 *supra,* p. 57.

[8] Report of the Secretary of the Interior, *op cit.* note 6 *supra.*

[9] Bureau of Reclamation, *How Reclamation Pays,* Washington: Department of the Interior, 1947.

Drainage

Drainage has been used in the past as a technique by which extensive lands have been developed into cultivable areas, and it presents some promise for the future. But drainage of lowlands is expensive. The Soil Conservation Service found that whereas farm drains which emptied into natural streams could be built at a cost of about $5 to $30 per acre, drainage on land which required an outlet averaged from $15 to $40 per acre.[11] Some of the most far-reaching drainage projects are for lowlands of the Gulf coast and in the deltas of the Red River and the lower Mississippi. In the last seventy years, 8 million acres of agricultural land have been developed for farming in the lower Mississippi Delta, and since the war considerable other work has been done, especially north of the Red River. It is expected that 4,000 to 5,000 new farms may be under operation in this area by 1954.[12] Existing values such as the annual multimillion-dollar muskrat trapping industry of Louisiana cannot be overlooked when further drainage is contemplated. Moreover, flood protection will have to become more effective as these lowlands are developed. In the past, maintenance of drainage facilities in the valleys of the Mississippi and associated rivers has proved more expensive than in surrounding uplands—another factor worthy of consideration. This high maintenance cost has been caused in part by the filling in of channels with eroding soils from hillsides. Much redredging has been necessary.

In recent years the drained lands have done well as a result of high farm incomes in the postwar period. Districts where drainage is common have been able to pay off indebtedness, partly as a result of the favorable adjustments made possible by the Reconstruction Finance Corporation in the late 1930's.

A study of drainage in Sussex County, Delaware showed that the benefits derived would meet the costs and eventually provide the basis for gains. A drainage project in Rhode Island costing from $30 to $125 per acre, where the improved land was to be used for pasture and hay, was also considered worth while.

Possibilities and costs

In the Southeast, where the natural increase of the population is at a high rate in comparison to that in other parts of the country and where extensive acreage has been rendered unfertile by erosion, the pressure to develop new lands is great. A local survey made by the Soil Conservation Service showed that in Jasper County, South Carolina, 150,000 acres of land when cleared and drained would be suitable for farming. These findings were deemed applicable to similar areas of the Lower Coastal Plain of Georgia, North Carolina, and South Carolina, and the estimated costs in 1948 averaged $105 per acre: $55 for clearing after deduction of salable timber, $40 for drainage, and $10 for other costs.

Costs in other parts of the Southeast may vary above or below those in the Lower Coastal Plain, but studies of the Virginia Piedmont show that opportunity for the development of new farm units is slight. A considerable amount of land in Virginia and North Carolina is held for investment and is tenant farmed. Some of the owners who have considered clearing and drainage of their undeveloped lands have found that the advantages to be derived did not warrant the costs, and that it was more profitable as an investment to grow timber than to reclaim the land for cultivable crops. As long as enough farm crops to meet demands are produced on lands that are already improved or maintained at a productive level, new development of lands is not economically remunerative, and it is unfortunate that land advertisements have been persuasively designed to give a different impression.

---

[10] Bureau of Reclamation, *op. cit.*

[11] Wooten and Purcell, *op. cit.* note 5 *supra*, pp. 5–6.

[12] *Ibid.*, pp. 35, 37.

RESTORATION OF OLD LAND

In the Southeast, the Corn Belt, the Lake States, and the Northeast, improvement of existing land suitable for cultivation presents an important challenge. Whether the development of new lands in these areas by clearing, drainage, or irrigation is justifiable is not so certain. The character and the amount of work required for restoration vary greatly. The extreme would be represented by farms on which boulders would need to be removed, stone fences buried in deep trenches, brush cleared, wet spots drained, field layouts and fencing changed, and strip cropping, liming, fertilizing, and seeding carried out. A more general situation, represented by the typical Soil Conservation District farm plans, would simply involve improved layouts, liming, fertilizing, and establishment of sound rotations based on increased use of grass-legume meadows. Where this latter is possible, an investment of perhaps $30 an acre is probably sufficient, and experience indicates that a three-year credit period is ample to repay the cost from increased earnings.

In New England, where farming is not a lucrative profession in comparison to other occupations, clearing brush for seeded pasture was estimated to run as high as $50 to $110 per acre in 1949.[13] Woodland clearing for orchards, vegetables, and other crops ranges from $95 to $160 per acre. The removal of light brush in recently abandoned fields would cost much less. Clearing in the Southeast could perhaps be kept as low as $25 per acre without stumping in areas where some returns could be derived from the timber.

Cultivated land

There is evidence that improvement and renovation of lands which are now cultivated is the most advantageous form of restoration. Estimates in a study of *The Rural Economy of New England*[14] showed that net income per acre increased in proportion to the amount invested for stepped-up productivity, although the smaller investments paid off more quickly. Another estimate[15] indicates that the costs would be about $30 per acre for "a good but fairly simple protective job, including expert help, fertilizer, seed, and use of machinery."

A study of farms in seven counties in Illinois[16] revealed that the county average of cost of conservation needs ran from $14.50 to $22.63 an acre. The farms were divided into two matched groups—"high" and "low" conservation farms—and it was found that the "high" farmers spent about 66 cents per acre

---

[13] Wooten and Purcell, *op. cit.* note 5 *supra.*

[14] John D Black, *The Rural Economy of New England,* Cambridge, 1950.

[15] Stephen Raushenbush, *Our Conservation Job,* Washington, 1949

[16] Elmer L. Sauer, *Economics of Soil and Water Conservation: Effects of Practices Followed on Farms in Selected Illinois Areas,* Urbana, Illinois, 1947.

COMPARISON OF COSTS

Purpose of project	Area	Average cost per acre (in dollars)	Year of estimate
Restoration of lands in various stages of productivity	Average U. S.	30.00	1949[a]
	New England	19.00	1948[b]
		24.50–101 00	1950[c]
	Illinois	14.50– 22.63	1947[d]
		24.00	1949[e]
		35.00	1949[f]
	Missouri	36.30	1948[c]
	Iowa	18.00	1949[g]
Clearing[h]			
Without stumping	Massachusetts	15.00– 30.00	1947
	Southeast	25.00	1946
	Delta states	17.00	1930–1940
	Pacific Northwest	18.00– 39.00	1944
Complete clearing (after deduction of salable timber)	General	50.00– 75.00	1946
	Massachusetts	95.00–160 00	1947
	North and South Carolina	36.00– 50.00	1947
	Delta states	30.00–100.00	1945–1948
	Pacific Northwest	57.00–200.00	1944
Drainage[h]	General (new areas)	15.00– 40.00	1946
	Rhode Island (including clearing)	30.00–125.00	1948
	South Carolina	40.00	1948
	Delta states	8.00– 25.00	1945–1948
Irrigation[i]	Columbia Basin	233.00	1950
	Central Valley	300.00–690.00	1950
	Missouri Basin	145.00 (supplemental)	1950
		440.00 (new land)	1950
	Rio Grande		
	Fort Sumner Project	380.00	1950
	Colorado		
	Grand Valley Project	141.00	
	Central Arizona Project	620.00[j]	1948

[a] Raushenbush, cited note 15 *supra.*

[b] Black, cited note 14 *supra.*

[c] Black and Kiefer, cited note 17 *infra.*

[d] Sauer, 1947, cited note 16 *supra.*

[e] Sauer, "Dividends from Conservation Farming," *Journal of Soil and Water Conservation,* Vol. 4, No. 1 (Jan. 1949), p. 34.

[f] Estimate of the Soil Conservation Service, cited in Sauer, 1949.

[g] Murray, Heady, and Timmons, cited note 18 *infra.*

[h] Wooten and Purcell, cited note 5 *supra.*

[i] Report of the President's Water Resources Policy Commission, 1951, *Ten Rivers in America's Future.* Includes only costs allocated to irrigation.

[j] $2,200 if new acreage actually benefited is considered.

per year more than the "lows." But the crop yields for the "highs" were 9 per cent to 21 per cent higher and their net returns $7.22 more per acre. Therefore, the 66-cent investment returned them $7.22—a rate of return of $10.94 on the dollar. The farms had been matched at the beginning of the study so as to make their net income and crop yield index similar.

A seven-year program worked out for a Missouri farm of 267 acres[17] showed that an investment of $9,700 ($36.30 per acre) including interest and hired labor would increase net income by $2,000 a year.

A case history of a 160-acre farm in Iowa[18] indicated that an $18 an acre investment (actually $23 if the farmer borrowed in order not to reduce his level of living) would result in decreased returns for the first three years. But even with the minimum returns that could be expected, the investment would pay off in nine years.

Other case studies have shown that the investments pay back with interest. Yields usually double, and the net income is tripled or quadrupled. Often a program covering several years is necessary to make the investment pay, but this time lag is favorable in comparison to the construction period needed to build irrigation and drainage facilities.

THE QUESTION

There can be no doubt that the continued development of land is necessary to meet the needs of an increasing population as well as expanding commitments. Moreover, some of our land is still being depleted and will have to be retired from cultivation before long. Other areas of cultivable land will be needed for road building and urban and industrial development. Certainly the yearly acquisitions of new land by drainage or irrigation operations and conservation practices have never been sheer gain, nor are they expected to be. But with newly perfected developments in farm technology, the trend will be towards producing a greater amount of crops on the same amount of land.

For the most efficient use of land, consolidation of farms and fewer of them may be the direction in which we should move. Yet human desires cannot be ignored, and at the present time the demand of citizens seems to be for more farms. Prices are high, and good farming land is difficult to obtain at the present time. The number of those who are lured by marginal or poor lands is not inconsiderable.

Whether it be in the best interests of the country for the government to create new lands for the cultivation of crops when the productive capacity of the lands now being worked could be increased with greater efficiency and economy is a subtle question. The role of a democracy may encompass the obligation to provide citizens with reasonable opportunity to choose a profession and way of life that they feel strongly about, especially when deriving a livelihood from the land has played such a significant part in the historical heritage of the country. Furthermore, it may be argued that the farm areas have replenished the populations of our cities in the past, and, with the curtailment of immigration, will be more important in this respect in the future.

On the other hand, at a time when every exertion is being made to preserve some vestige of security in the world, it may be regarded as something of a luxury for the government to develop new lands at great cost if more practical solutions to expanding needs are apparent. The justification of developing new lands on the basis that the drainage and irrigation facilities envisaged would also serve to improve existing lands is an argument without end. If a line is ever drawn, the competition for obtaining a good farm will be heightened; but this in itself might be a factor favoring better land use in the long run.

---

[17] John D. Black and Maxine Kiefer, "Food the U. S. Could Produce," in *Future Food and Agriculture Policy*, New York, 1948.

[18] William G. Murray, Earl L. Heady, and John F. Timmons, "Economic Aspects of Soil Conservation Problems," *Journal of Soil and Water Conservation*, Vol. 5, Jan. 1949.

Paul B. Sears, Ph D., New Haven, Connecticut, is chairman of the Conservation Program at Yale University. Previously he taught botany at Ohio State and Nebraska universities. Later he was professor of botany at the University of Oklahoma and Oberlin College, and served as research associate at Teachers College, Columbia University. He is author of Deserts on the March (1935), This Is Our World (1937), Who Are These Americans? (1939), Life and Environment (1939), This Useful World (1941), and Charles Darwin (1950), and is a contributor to botanical journals, especially on ecology and conservation.

Economic Analysis of Land Use on the Western Ranges

By M. M. Kelso

The Theoretical Framework

INVESTMENT, for conservation or development, in any resource that yields a recurrent product is a problem in maximization over time of the social net product derived from use of the resource and its associated productive resources (1) with only so much investment as is needed to maintain unchanged the level of physical productivity of the resource in question, and (2) with investment of capital funds or labor to enhance the physical productivity of the source. The two are separable in theory but not in practice.[1]

Maximization of social net product from these resources with or without investment to enhance productivity is attained through control over production and investment inputs through which effect is given to decisions as to the kind and proportionality of inputs to commit to production systems based upon the utilization of these resources. Such decisions are made by entrepreneurs acting through firms, the requisite control over conjoint resource inputs being provided by the institution of property. Such firms may be privately managed or publicly managed, and the property may be private property or public property. Under capitalism, it is presumed that maximization over time of private profit to the firm is synonymous with maximization over time of social net product unless there is clear evidence to the contrary.

Maximization over time of *private firm profit,* with or without investment to enhance productivity, refers to maximization of the discounted stream of net profits anticipated by the firm resulting from the resource commitments decided upon by it. The discount factor will be larger (smaller) as the risks and uncertainties of the future seem to the firm to be greater (less).

Maximization over time of *social net product,* with or without investment to enhance productivity, refers to maximization of the discounted stream of "social benefits" over "social sacrifices" anticipated by the "public firm" resulting from resource commitments decided upon or permitted by it. Many of the benefits and sacrifices are not measurable in monetary terms; even for those that are, their over-all effect within the total economy is not empirically, though it is theoretically, measurable. The discount factor used by public firms (except under stresses brought about by need for short-run survival of the society) will normally be smaller than for private firms.

When resource use is under the joint control of two (or more) public and/or private firms, maximum net social product will result from its use only when the goals and expectations of the firms are alike, only when the time pattern of their inputs (costs) are comparable, and only when they share in returns comparable to their shares in costs. Otherwise, inputs and returns will be distorted away from a maximum either towards a shorter or a longer time span pattern or towards a different combination of product outputs, or both.

---

[1] To be theoretically complete, a third aspect of the problem should be stated, namely, disinvestment (deterioration) over time of the resource to maximize social net product. But to keep the argument within limits that can be treated in this paper, the third problem will be ignored by the assumption that deterioration of the recurrently productive resource—range land—is never socially justified.

BASIC ASSUMPTION

The function of theory is to guide the search for facts, determine their meanings (definitions), provide for their classification, and subsequently to lead to testable, predictive hypotheses as to what *will* happen over time within the situation, or what *can be made to happen* better to attain specified human ends. Within the theoretical context described, we will now turn to a description of the situation within which our problem lies. We begin with the presumption that the conservation and development of the western public range land resources are important to the nation, that these resources are neither developed to the point of economy nor used at the point of maximized long-run social income, and that this state of affairs is largely due to the institutional setting within which the use and development of these resources occur.

THE NATURAL ENVIRONMENT

A full description of the facts of the natural environment within which our problem lies is necessary to a complete understanding of the argument. But in order to confine our analysis to the space limitations of this article, we must be satisfied with a categorical listing of the more important features.

1. The low inherent productivity per acre of these range lands (largely due to relative aridity or rough and barren mountain slopes) requires many acres for even minimum "family-sized" livestock farms.

2. The plains sod grasses, the shrubs and bunch grasses of mountains and semideserts, the annual weeds, react differently to use and abuse. Misuse will do less long-run harm, and damage will be more narrowly confined to him who causes it, in the plains sod grasses than in the bunch grasses and rough mountain ranges.

3. Hay and feed crop production is a necessary supplement to range use throughout the West except in parts of the far Southwest.

4. Except in the year-long range use areas (plains and far Southwest), range lands of proper seasonality together with necessary hay and feed crop lands do not lie interspersed so as to permit ranch units organized in self-contained blocks behind their own "line fences."

5. Water and water development are factors of crucial importance in western range land use. Hay and pasture irrigation and stock water supplies are essential to full use of associated ranges. Two-thirds to three-fourths of the water for irrigation, power, and urban use in the West originates on public land in high mountains. A significant portion of the negative value flood and silt flows originate on lower-lying semiarid range lands, both publicly and privately owned.

6. A significant portion of these western range areas are producers of other values besides range forage—water, recreation, lumber, and, negatively speaking, floods and silt.

7. Much of the western range can be materially increased in productivity by capital investments for revegetation, water development, fencing, and other purposes.

THE FIRMS

In any economy, the use and development of its resources are organized through "firms"—the units through which management decisions are channeled into action. In our economy, the conservation, development, and use of our western range resources are carried out by both public and private firms.

Western range resources are utilized

through private entrepreneurial units usually called ranches. These firms are private businesses run to serve private ends, one of the more important of which is profit. These firms assemble the resources needed for a livestock business—labor, livestock, other capital items, and land—manage their use, and determine how and for what the resources owned by them shall be used. As with private firms everywhere, given the conditions imposed upon them by the property institutions and given the technical knowledge of the manager, the firm tries to maximize the flow of satisfactions coming to its owners.

Unlike any other type of agriculture in the United States, public firms play an important role in the western range livestock industry. Here, a large part of the basic land resources are owned by government and managed by government agencies. But these agencies do not carry out all entrepreneurial functions—they do not harvest, they do not invest operating capital. They look after the government-owned resources, assign their use to private users, and make capital investments for conservation and development. They perform a landlord function.

These firms are agencies of government, which means that they serve as trust agents for the citizenry to manage the public's land. Presumably, the management goal of these firms is to maximize over time the sociocultural returns to the public from use of the public's land. Objective measurement of returns to alternative uses of public lands is a much less definitive thing than is objective measurement of profits from alternative uses of private resources.

Except for the Bureau of Land Management, whose advisory boards of users have some say in management, only employees of these public firms have direct say on matters of allocation, use, development, and management of these public resources. However, these employees are aware of and often influenced by what they think or know the vocal and influential part of the public may tell or be telling Congress about them. They are rarely domineering or dictatorial in their relations with private users of the lands in their charge. They are usually helpful to and sympathetic with the private firm's problems that grow out of its relations to public lands.

The public firms decide what investments for conservation and development are economically and socially justified on these lands. But except for the BLM "improvement funds" derived from grazing fees, they must ask Congress for the money to carry out these improvements. These public firms find it difficult (in fact, in the light of fifty years of experience they have found it impossible) to secure adequate funds from Congress for the needed investment in conservation and development of these public grazing lands.

THE PROPERTY ENVIRONMENT

Private property

Slightly more than 50 per cent[2] of the western range lands are privately owned. But private ownership controls the more productive ranges, so about two-thirds[3] of the range feed is produced on private lands.[4] The proportion of private ownership is greatest in the plains and least in the semideserts and mountains.

---

[2] *The Western Range,* Senate Document No. 199, 74th Cong., 2d sess., 1936, Table 2, p. 7 and estimated from Table 2 and Table 82, p. 508.

[3] *Ibid.*

[4] When it is considered that virtually all feed production from improved pasture, hay and crop land in the region comes from privately owned land, it will be realized that much more than two-thirds of all western livestock feed is produced on private land, possibly as much as 80 to 90 per cent.

Not all privately owned range lands are used by the firms who own them. Several railroad corporations own extensive areas; nonresident individuals are an important class of owners, especially in the plains. Thus, it is evident that there is considerable private leasing of range lands by livestock firms.

Relatively few livestock firms in the West operate wholly on privately owned land, and fewer still own, themselves, all the land on which they operate. Such as do are almost wholly in the eastern edges of the plains. The property status of ranch firms varies from those with wholly privately owned lands to those who own only spring-fall range and/or hay and crop land or those who own only hay land and water controlling tracts. Though as recently as fifteen years ago ranch firms existed that owned (or legally controlled) no land at all, such firms no longer exist—all today have a base of controlled land of some sort. But in many areas, the privately owned ranges and feed crop lands cannot be used economically without the conjoint use of adjacent public land—and vice versa.

Public property

Publicly owned range lands furnish feed resources less than in proportion to their acreage. However, in many areas they furnish an indispensable part of the annual feed supply.

Public ownership is in the hands of county, state, and federal governments. We will consider only the last-named, for lack of space to treat them all. Of the many classes of federally owned range lands, we will consider only two—those administered by the United States Forest Service and the United States Bureau of Land Management, which control between them about three-fourths of the publicly owned range.

THE FOREST SERVICE

The Forest Service was set up early in this century to administer the lands withdrawn from the public domain for purposes of forestry and watershed protection and such other uses as are not inconsistent with the two specifically named. Under the latter clause, grazing and recreational use of the Forests has developed. The Forest Service has, over forty-five years of experience, formulated policies and procedures for the orderly supervision of grazing use of Forest lands by private firms.

It is most important to note that private use of public land under positive federal landlordship had not previously existed in the United States; therefore the Forest Service had to build its own policies and methods without guidance from any previous experience.

It is next important to note that grazing was a subordinate use, permitted only as long and as far as it did not interfere unduly with timber and watersheds.

Out of these circumstances developed the system under which grazing use by private firms is a privilege and not a right. This privilege is granted by a "permit" which is not a contract, but can be (legally though not politically) revoked or changed at the will of the Forest Service. The permit gives no contractual assurance as to the number of head or the season of use that will be permitted in any subsequent season. However, when it is a "ten-year permit," it does assure its holder that he will have the right for ten years to graze whatever numbers for whatever seasons are authorized under it each year. The permit is not directly salable or otherwise transferable, even through inheritance. If a ranchman holding a

Forest grazing permit dies or transfers or sells his ranch, whether or not a permit will be issued to the new owner, for how many head, and for how long a season, are determinable solely by the Forest Service. It is a policy of the Service (infrequently exercised, but available) to reduce permits of firms larger than some established maximum whenever transfer takes place.

All decisions at all times as to who shall graze on the Forest, with what kinds and numbers of livestock, for how long a season, and under what management rules, are the legal responsibility of the Forest Service, which it has not delegated either to individual users through contracts or to advisory boards among its users.

In addition to permit cuts for conservation and protection of the range, the Forest Service has an adopted policy of cuts and transfers of grazing privileges designed to encourage sound family-sized livestock firms. The policy works by cutting down on permits held by firms above certain maxima in size to add to permits held by firms below certain minima in size when such small firms have the necessary supplemental feed resources and are situated so that they can use the added Forest range economically. This policy has been infrequently used, but is always available. Permit cuts for range protection have been much more prevalent than have cuts for redistribution.

National forest range is predominantly mountain range, largely furnishing summer grazing to private firms who must own or control other feed resources to maintain their livestock while not on the Forest. Sometimes only one private firm can efficiently use adjacent forest range, in which case its permit for Forest grazing is relatively secure, though a sense of insecurity may arise because it may be cut in numbers and season at any time. More commonly the alternative users available to the Forest Service are more numerous; then the user may feel an additional insecurity, especially if his firm is above the established local maximum for size.

Fees and investments

The fee charged for grazing use on Forest lands is not a significant source of uncertainty to the operator. A base fee per animal unit month was set Forest by Forest by the Service many years ago; the annual fee is set by a formula based on changes in the market price of cattle and sheep relative to similar prices in the base period. The base fee was set at a comparatively low level, so the fee for Forest grazing is usually cheap, relative to private land costs, and the firm is assured that the fee will fall with falling livestock prices.

Investments to protect or enhance the productivity of the grazing resource in National Forests are solely the responsibility of the Forest Service and the Federal Government. The private firm that uses Forest range could, until recently, make such investments on its allotted range, but under restrictions so severe and under uncertainties for the future so disturbing that little use was made of the privilege. Recently, even the limited privileges heretofore available have been withdrawn. Thus, essentially all investments in Forest range are dependent on appropriations made by the federal Congress.

BUREAU OF LAND MANAGEMENT

Largest in area among the many kinds of range land administered by the Bureau of Land Management (the BLM) are the remnants of the public domain—that part of our vast federal landholdings that, after 140 years of picking over, no one has wanted in 640-acre parcels even as a free gift (homestead). Provision for their positive protection, development, and management was made by Congress only eighteen years ago (1934). They are, in the main, the poorest of all our grazing lands; in their native state their productivity was in many cases low, and after seventy years of use under no positive landlord control whatever, many of them are badly depleted. The BLM estimates that 50 per cent of the grazing land under its control is severely depleted and that another 32 per cent is moderately damaged.

The BLM grants grazing use of these lands to private firms usually under ten-year permits. The BLM permits, like the Forest permits, are not contractual obligations. Numbers of stock, lengths of season, and management practices on the ranges may legally be changed at any time by the Bureau. But partly because the other possible uses of the grazing resources managed by BLM are of limited importance, partly because the basic law under which BLM operates gives a positive and superior place to grazing and to the stability of the user's privileges, and partly because of policies adopted by BLM, permits issued by it are less subject to change during their ten-year life, they are transferable with the base property to which they "attach," and they are not subject to reductions for redistribution or at transfer.

BLM grazing land is predominantly winter range—even usually semidesert range. As with Forest lands, these BLM lands generally do not make self-contained ranch units but must be used in conjunction with lands of other types and ownerships.

Fees charged by the BLM are fixed in amount, do not fluctuate with livestock prices, and are very low, particularly at this time of high livestock prices, as compared with Forest grazing fees or private land costs.

BLM grazing lands, naturally low in productivity and often badly depleted, need much investment for conservation and development. Permittees can make investments for improvement of these lands—with approval of BLM—with greater freedom and with somewhat greater certainty that they will derive future benefits from them than is the case with permittees on Forest lands. On BLM lands, furthermore, private firms contribute through the fees they pay to the funds needed for improvement of the lands. By law, a stipulated portion of the grazing fees collected must be used for development of the resource. But because fees are at such a low level, the portion stipulated for development accrues in very small amounts each year—much less than required for full economic development of the lands.

As with Forest lands, except for the small amount secured through fees collected, investment funds for conservation and development of BLM lands depend upon congressional appropriations.

Some BLM grazing lands, different from any Forest lands, may be sold or leased to private firms. These are those small and isolated remnant tracts of the public domain that do not lend themselves to efficient administration by the Bureau.

THE PROBLEM TO BE SOLVED

The foregoing is merely a description of the situation within which use, conservation, and development of our western public range resources take place. The problem that it raises contains at least two elements, each equally important: (1) Much of the public grazing land has other actual or potential usefulness than grazing. How shall it be determined what use or combination of uses is best? (2) Under what form of tenure should public land committed to grazing be put in the hands of the private grazing firm?

Theory with which to solve the first aspect of the problem is not well enough developed to provide a definitive analytical base, so we will confine ourselves to the second aspect.

Not all public grazing lands are alike. For some, private ownership may be preferable; for others, public ownership. In the latter case, the situation is that of a landlord-tenant institution in which the tenant is a private firm, *but the landlord is an administrative unit of government.*

Private firms (and private livestock producing firms are no exception) find an atmosphere of bargaining transactions most congenial to the rationale of their behavior—a willing buyer and a willing seller, each with an accessible alternative of nearly equal value, bargaining out mutually acceptable contracts with performance enforceable in the courts. Public firms (and public land managers are no exception) find an atmosphere of rationing transactions most congenial to the rationale of their behavior—a superior authority distributing privileges among subordinate firms under rules or policies laid down by the superior to guide its distributions. The private firm tenant contends for arrangements formulated within the context of bargaining transactions; the public firm landlord contends for arrangements formulated within the context of rationing transactions. The two do not mix; the contending parties are striving for incompatible things.

So we find two roots to our problem: (1) Under what circumstances should public grazing lands be transferred to private ownership, and (2) what institutional arrangement reasonably congenial both to private tenant and public landlord should attach to those grazing lands that must remain in public ownership?

Measures of efficiency

A solution to these root problems will rest on a determination as to which arrangement in each case will function most efficiently for society. What constitutes a measure of efficient functioning in this context that may serve as a basis for evaluating alternative arrangements on public grazing land?

Within the context of economics there seem to be two closely related measures: (1) maximum economic productivity from whatever grazing resources are rationed to use by private firms, and (2) an optimum degree of progress as reflected in an optimum level of capital investment in the grazing resource to enhance its productivity and ensure its conservation.

A further measure, found within the context of social theory, seems necessary, namely, that in those circumstances where alternative tenure arrangements seem to function with about equal economic efficiency, that alternative be chosen which is most in harmony with the cultural habits, ideals, and goals of the society.[5]

HYPOTHESES TO SOLVE THE PROBLEM

We turn now to the last step, that of outlining through theoretical analysis the hypotheses of problem solution. We can best approach the task in two parts. First, under what circumstances is public ownership of grazing land not essential to attainment of maximum economic efficiency and progress? Second, where it is essential, under what landlord-tenant arrangements can we attain maximum economic efficiency and progress?

---

[5] This formulation of the criterion begs a basic but so far unsolvable question, namely, how much sacrifice in economic efficiency is warranted in the interest of cultural harmony, and vice versa. In the absence of definitive, quantifiable theory to treat this problem, I propose to ignore it by positing that where economic efficiency is approximately equal, cultural harmony as a criterion of choice shall enter into judgment.

Private versus public ownership

Private property in agricultural land is presumed in all capitalistic societies to give the firm that degree of security of expectations necessary for it to plan in a time dimension such as to maximize economic productivity over time, including an optimum degree of conservation in the present and an optimum degree of investment for increased productivity in the future. Private property in agricultural land fails to attain these ends perfectly—especially for society—as we in the United States know from experience. But it is significant that practically no voices are raised urging public ownership of pasture and crop lands to protect them from abuses by private firms or to enhance investment in their increased productivity. But many voices are so raised relative to western grazing land. It would seem that, except where there are clear reasons to the contrary, western grazing lands—which are a form of agricultural pasture land—should be privately owned in harmony with our cultural ideals.

What clear reasons are there to the contrary? By far the most important is multiple use. Certain of the uses practiced on public range lands are necessarily public in character (recreation, and water production for power and irrigation), and certain of the uses are not generally practiced jointly within single private firms (stock raising and lumbering). For combinations of such uses, private ownership does not serve the end of maximized economic productivity. Certain of the uses will be slighted or completely ignored if the lands are privately owned. Where multiple use of grazing lands is an important factor, private ownership will not be suitable.

Some western public grazing lands, though used for grazing only, are so low in productivity that it does not pay private firms to own them. Such lands produce no net economic return with which to pay interest on investment and real estate taxes. If such lands are to be used by private firms and are to be properly managed, they must be owned and their use supervised by a public landlord.

The social costs of resource deterioration are not so acute on western privately owned grazing lands as they are on the far more productive, more valuable, privately owned pasture and crop lands in the humid areas to the east.

> It is paradoxical that the grazing lands east of the 100th meridian are in a relatively poorer condition than those in other parts of the region (the Great Plains). Of the 15 million acres in poor condition (in the Great Plains), 9½ million acres are located in this area (east of the 100th meridian). The native grazing lands remaining in this area have lost so much of their original grasses from hard use that it generally requires complete new seedings of the native bluestems or other adapted grasses before the potential production can be restored. It is in this area that reseeding and careful management will net the greatest returns for time and money expended.[6]

Yet it is for grazing lands west, not east, of the 100th meridian that public ownership is urged to prevent their private owners from "shoveling them into the Gulf of Mexico."

So we conclude that any western public grazing land that has no use of significance other than for grazing and that is productive enough to support the costs of private ownership can, in keeping with our cultural ideals, be transferred to private ownership. By so doing, these lands will be in a setting where long-run security of property and contract on the part of the user will lead to that degree of maximized economic productivity and optimized investment for conservation and development that private firms in agriculture generally attain.

---

[6] *Post-war Programs of Conservation and Improvement of Range and Native Pasture Lands in the Northern Great Plains*, Section II of Report of Subcommittee on Soil, Range and Forest Development, and Conservation, Northern Great Plains Agricultural Advisory Council, June 1, 1944, p. 13.

Public landlord-private tenant relations

Much of the public grazing resource will remain public property for the reasons described above. But if it is to be used for grazing, such use will be carried out by private, not public, firms. Consequently, on such publicly owned grazing resources we have a problem of tenure relations between public managers and private firms. This is a problem in public landlord-private tenant relations.

Relative to the solution of this problem, the only experience to guide us is that of the Forest Service and the Bureau of Land Management.

Here our hypotheses for problem solution will be theoretical; their validity will be indeterminate (except as far as analogy to private landlord-private tenant relations can be considered pertinent) until such time as they may be put to the test of trial and experience. Here we will be "speculating"—inventing—to find new institutional forms better to meet a social problem.

Our reasoning here is within and derived from the propositions with which this paper opened. We will apply them to the peculiar conditions of western public grazing land management and use.

1. The public grazing land manager will be concerned, normally, with long-run rather than short-run returns and with investments for conservation first and for long-run development second; he will be little or not at all concerned with costs and returns relative to current productive use of the resource; he will thus distort inputs in the direction of long-run future returns. And because his time discount factor is smaller (normally) than that of the private firm, he will direct investment inputs towards even more distant returns than will the private firm. When the time patterns of costs and returns are not comparable as between public and private firms, maximization of net product is jeopardized.

2. As long as the public land manager insists on absolute liberty to alter the use to which the grazing land is committed or to change the user to which it is rationed, the private firm user has limited security of expectations relative to long-run returns from such investments in the land as he may wish to make, and will distort his inputs toward short-run returns, including deterioration of the land resource. Furthermore, because of the peculiarly close relations between publicly and privately owned range resources in the western grazing industry, the private firm will feel insecure regarding the investments it has or may wish to make in its privately owned land resources.

3. Control over or access to adequate capital funds to finance investments in public grazing land (together with capital to finance other resources in the grazing firm) to the level of maximum economic productivity may be unequal as between the private firm and the public land managing firm. Under current economic conditions, the private firms are, in general, well supplied with capital for adequate long-run investments and, given security of expectations, are anxious to make such investments because of low interest rates, high income taxes, and the high level of prospective marginal returns to meat and wool production. The public land managing

firms, on the other hand, find it difficult (in the light of fifty years of experience it can be said they have found it impossible) to secure adequate funds from Congress for the needed investment in conservation and development of these public grazing lands. Such chronic inadequacy of public funds seems to derive from public apathy towards the need for such investments and from competition for public funds from other claimants with more appeal. Furthermore, given security of expectations, those private firms not possessing capital adequate in amount for economic long-run investments can and will obtain it in the private capital market. It seems evident that greatly expanded investments in conservation and development of public grazing resources would result from a greater degree of security of expectations granted to private firms.

4. Given security of expectations, the private grazing firm will be able to allocate inputs as between short-run and long-run returns to maximize returns from the resources comparable to those of the firm that owns its resources outright.

5. Security of expectations, in the above sense, implies a tenure arrangement comparable to contract, for reasonably long terms, enforceable in the courts, and transferable.

Principles of action

Propositions 1 through 4 above are empirical generalizations; proposition 5 is a definition. Test of the validity of propositions 1 through 4 awaits empirical research. If, however, they are accepted as true and valid, it follows that the problem will be solved (under circumstances where the public grazing land cannot be transferred outright to private ownership) by the following principles of action (which are simply hypotheses until tested by empirical evidence and experience):

1. The public land manager must decide (within the context of theory and relative to ends not herein discussed) to what uses the public land shall be put and in what proportion of intensities as between such uses.

2. The public land manager must decide upon and carry out a rationing plan by which it will be decided to whom grazing uses to be permitted on the public land will be allocated. (The goals to be attained by such rationing and the theory within which their realization must be analyzed have not been discussed in this paper.)

3. But once it has been decided what intensity of grazing use will be permitted on the public land and to whom it will be rationed, such uses must be assigned to the grazing firms with a reasonable degree of security of expectations on the part of the private firm so that it will be able to realize gains and losses from investments and decisions made by it relative to such resources.

4. Reasonable security of expectations requires that the grazing resource be made available by a long-run (even perpetual) contract that is renewable (if not perpetual), enforceable in the courts and transferable. If the contract is not perpetual, it should be for a sufficient number of years to permit the private firm fully to depreciate such investments as it may make for conservation or enhanced productivity.

5. Not all investments for conservation and development will or should be made by the private firm in the first few years of such a contract. It would be desirable that such investments be made by the firm continuously throughout its tenure. Consequently, no economically valid date for contract termi-

nation will ever occur. Two alternatives are possible: (*a*) perpetual contracts freely transferable by the private firm, purchasable by the public firm at a negotiated (or condemnation) price should the public firm wish to change the grazing allocation; or (*b*) term-of-year contracts which provide that unexhausted investments at the time of contract termination shall be appraised by a specified means, and the new allottee (or the government) must pay such appraised price for the unexhausted investments if the contract is not re-executed with the same grazing firm.

6. Rental fees for the use of grazing privileges by private firms should be set at their full economic value (*a*) so as not to distort allocations of capital resources by making such publicly furnished grazing unduly cheap, and (*b*) so as not to provide windfall gains to first allottees of public grazing. (The context of theory within which such values would be determined has not been discussed in this paper.)

M. M. Kelso, Ph.D., Bozeman, Montana, is head of the Department of Agricultural Economics and Rural Sociology and the Department of Economics and Sociology at Montana State College. He operated a cattle ranch in eastern Montana from 1942 to 1946. He was employed in the Submarginal Land Purchase Program, Resettlement Administration, 1933–37; was head of the Division of Land Economics, Bureau of Agricultural Economics, 1937–41; and was regional representative of the Bureau of Agricultural Economics at Albuquerque, New Mexico, 1941–42.

A Rounded Land Conservation Program

By CHARLES M. HARDIN

THIS article deals primarily with a federal program for farm and ranch lands in private ownership in the United States, proposing a reorientation of present efforts toward the objective of "improved farm family living on a conservation base." Conservation is taken to mean development and use as much as protection against aggravated erosion and soil depletion. A "rounded" program is not one which presents no "angles" for exploitation by organized interests; rather it is one designed in recognition of the relationship of land use to other resources and to the relevant pattern of human activities.

PRESENT PROGRAMS

The 1945 census reports 5,860,000 farms and ranches which include 1,142,000,000 acres or 60 per cent of the area of continental United States. What are the present land conservation programs in this area? How may they be redirected? [1]

The Soil Conservation Service (SCS) is a bureau of the United States Department of Agriculture (USDA) which assists farmers to develop and apply complete farm plans in accordance with the principle that "each acre of agricultural land" shall be used "within its capabilities" and treated "in accordance with its needs for protection and improvement." This has now become the "basic physical objective of soil-conservation activities" of the USDA.[2] The SCS co-operates with farmers through memoranda of understanding with soil conservation districts which are established under state enabling acts and now number approximately 2,400. Annual SCS appropriations are about $55 million double the amount available in 1940; some 94 per cent goes for "assistance to soil conservation districts and other co-operators." [3]

The SCS makes a conservation survey, similar to a soil survey, of co-operators' farms, helps to develop farm plans, and assists in applying the plans. In February 1951, SCS reported that some 900,000 farm plans had been made. But application proceeds slowly. After eighteen years, less than 10 per cent of the farm land in twenty-seven states had been "treated" in accordance with the SCS plans.[4]

The Department's other major "action" program of soil conservation is administered by the Production and Marketing Administration (PMA). It dates from the Soil Conservation and Domestic Allotment Act of 1936 which Congress passed to replace the original Agricultural Adjustment Act that the

---

[1] For an elaboration of many points made here, see the writer's book, *The Politics of Agriculture: Soil Conservation and the Struggle for Power in Rural America*, Glencoe, Ill.: Free Press, 1952; and articles, "The Politics of Conservation," *Journal of Politics*, Vol. XIII, No. 3, Aug. 1951; "Land or People," *Land Economics*, Vol. XVII, No. 2, May 1951; and (for the group planning approach of the Soil Conservation Service) "Natural Leaders and the Administration of Soil Conservation Programs," *Rural Sociology*, Vol. 16, No. 3, Sept. 1951.

[2] Memorandum 1278, Office of the Secretary, USDA, Feb. 15, 1951. *Hearings*, S. 1149, 82d Cong., 1st sess., p. 344.

[3] *Hearings*, Agricultural Appropriations, fiscal 1952, H. of R., Part 2, p. 782. The remainder of the appropriations is equally divided between research and the development and management of land utilization projects which include 7,200,000 acres.

[4] *Ibid.*, pp. 802–3.

Supreme Court had invalidated. The 1936 act authorized annual appropriations of $500 million for conservation payments to farmers; but the object was to increase farm incomes and to attain by financial rewards what the Court had just declared could not be accomplished by regulation, namely, the control of production. Appropriations approximated the authorization in early years, fell below $400 million for the first time in fiscal 1945, reached a low of $150 million in fiscal 1949, and currently amount to $256 million, which is near the average for the past eight years.[5]

The PMA conservation program is extensive, while that of SCS is intensive. In the early years, payments were earned chiefly by staying within the "soil depleting base" allotted to farms. When acreage allotments and production quotas were generally removed early in the war, the conservation program was shifted; payments could be earned only by specific performance as approved by the local committees (then of the Agricultural Adjustment Administration; since 1945, of the PMA); and participation declined somewhat, although the program continues to reach some three million farms annually. Considerable friction has existed between PMA and SCS; numerous efforts to combine the two programs culminated in Memorandum 1278 of February 1951, which aims at co-ordination at all levels. But friction and dissatisfaction continue, and the organization of the USDA is not necessarily settled.[6]

CRITICISMS OF PMA PROGRAM

Meanwhile, the conservation program of PMA continues to be criticized as stressing annual practices rather than long-run conservation farm plans,[7] as reimbursing farmers for what they would do anyway, as distributing the bulk of payments to farmers who need them least,[8] as representing undue expenditures in view of the federal budgetary situation, as providing an unhappy example of duplication of activities, and as maintaining an unhealthy dependence of farmers on payments from the Federal Government. Behind these criticisms are the fears, especially of the Farm Bureau and the colleges of agriculture, of the political power inherent in the PMA committee system.[9]

In addition, the co-operative agricultural Extension Service of the USDA and the land-grant colleges is involved. Its current budget of approximately $76 million (of which the Federal Government currently supplies about 43 per cent) enables a considerable range of educational, informational, and other kinds of services to farmers. A large, although undetermined, proportion of Extension's activities are closely related to improvement of land use. Relevant also are the co-operative researches of the USDA and the experiment stations of the colleges of agriculture. Thus, the Bureau of Plant Industry, Soils, and Agricultural Engineering currently spends some $2,750,000 on "soils, fertilizers, and irrigation investigations." The state experiment stations have a total budget of some $60 million (one-fifth from federal grants) of which a considerable though unknown amount is spent on investigations directly relevant to the present inquiry.[10]

---

[5] *Ibid.*, Part 1, pp. 60–61.

[6] Cf. the Aiken Bill, S. 1149, 82d Cong., 1st sess., *op. cit.* note 2 *supra.*

[7] *Hearings*, Agric. Approp., fiscal 1952, H. of R., Part 1, p. 618.

[8] *Ibid.*, fiscal 1948, Part 1, p. 1251. Twenty per cent of the co-operating farmers get 60 per cent of the payments.

[9] In general, midwestern and northern Farm Bureaus would eliminate PMA conservation payments, but southern Farm Bureaus want to keep them. The American Farm Bureau Federation unsuccessfully attempted to lower them to $150 million in 1951; the National Grange resolved in 1951 that they should be eliminated.

SIGNIFICANCE OF OBJECTIVES

In light of present efforts, what can be said respecting a "rounded land conservation program" for farms and ranches? The assumed need is to accommodate private interests and public purposes. Any conservation program for farm land is inevitably related to efforts to support agricultural prices and adjust agricultural production; as indicated, the conservation program of PMA originated as part of the government's major economic program for agriculture. In this program, parity has become a goal which in the thought of many farmers is to be achieved by government guarantees of specific prices for different crops and products. The public interest in economic stability in agriculture has been forcefully argued.[11] At the same time, the elevation of parity prices into *ends* of policy is strongly criticized as preventing prices and the market from performing the function of allocating resources, both within agriculture and between agriculture and other sectors of society.[12] But the vesting of emotional loyalties in parity has made it a symbol of simple economic justice for farmers, and the problem becomes one of preventing particular price levels from becoming equally sacrosanct. Thus the obligation to examine the objectives of programs becomes clear. How can such programs be restated to serve the purposes not only of improving land use but also of achieving effective agricultural adjustment in the public interest?

A somewhat similar question arises respecting soil conservation as an end in itself—as the "basic physical objective" of USDA conservation activities. The concept is appealing to those who wish to identify with some high moral purposes which cannot be called "radical" by the most unhinged imagination. Erosion is like sin; everyone is against it. But where is the cause of erosion to be found? The Chief of the Division of Soil Survey, USDA, has declared that erosion is generally a symptom. "Frequently, we find weak plant cover and declining soil fertility resulting from unstable economic conditions, bad tenure relationships, overcrowded land, poverty, disease, and wars. . . ."[13] Neither the present concept of objectives in soil conservation programs nor their current organization facilitates an attack upon the fundamental causes which Kellogg has delineated.

A PROPOSED OBJECTIVE

It is here proposed to set as a goal the improvement of farm family living on a conservation base. In stating this objective, the writer has in mind a program of research, demonstration, and extension which would take over the present SCS and become an effective guide to adjustment policy. Research should establish for typical farms the most favorable combinations of enterprises and of technologies under different assumptions about trends in the market. Imaginative and vigorous extension programs should help farmers to adopt—and adapt—the research findings. Thus what is needed is not only pilot (research) farms and demonstration farms, but also workable programs which will make the alternatives developed really available to farmers. Again Charles E. Kellogg has stated the program succinctly, and his educational objectives bear quoting: not simply for farmers "to introduce new practices rapidly and successfully," but for them to learn "how to use technology resulting from science in making their decisions."[14]

---

[10] In addition, the agricultural program coöperatively developed by the Tennessee Valley Authority and the colleges of agriculture (especially but not exclusively in the Tennessee Valley states) should be mentioned. This program will not be discussed here. Some of the literature indicates that the TVA program can be accommodated to the suggestions made below. Cf. Norman Wengert, "TVA and Agriculture: A Study in Regional Administration," unpublished Ph.D. thesis, University of Wisconsin, 1947; but contrast Philip M. Selznick, *TVA and the Grass Roots,* University of California Press, 1949. The writer prefers Wengert's analysis.

[11] Cf. John D. Black, *Parity, Parity, Parity,* Cambridge, Mass., 1942, and T. W. Schultz, *Agriculture in an Unstable Economy,* New York: McGraw-Hill Book Co., 1945.

[12] T. W. Schultz, *Production and Welfare in Agriculture,* New York: Macmillan, 1945.

[13] Charles E. Kellogg, "Opportunities for World Abundance," *Journal of Politics,* Vol. XIII, No. 3 (Aug. 1951), p. 340.

This restatement of objectives is advanced on grounds of judgment rather than scientific demonstration. The writer strongly believes in the importance of ideal objectives to policies and programs, and, in the present discussion, in the need for offering an ideal objective which can hope to contend successfully with the powerful appeals represented by parity prices and soil conservation as goals. It is further believed that the emphasis on farm family living stresses human beings essentially as ends rather than as means (for example, to improvement in soil conservation); second, that the new objective invites planning *farms* to make them economically more rewarding within the anticipated framework of prices in a relatively free market, instead of planning *prices* to make farming more profitable; and, third, that the shift in emphasis will invite consideration of the underlying causes of soil erosion and depletion, which tend to be overlooked in programs aimed directly at erosion control.

Arguments are at hand to sustain all these points, but no guarantee exists that the shift in objectives will fulfill the promises stated or implied above. Many agricultural economists advocated production payments as a means of supporting agricultural prices but vigorously protested the Brannan plan (which proposed such payments) because of the income support levels which it included. Likewise, improved farm family living is clearly an objective of the Family Farm Policy Review of the USDA in 1951; yet the strategy, timing, and approach of this review resulted in an aggravation of most of the differences now existing in agriculture and turned the analysis of public problems into a heated debate over political symbols. In the process, the family farm tended to become a shibboleth to the friends of the review and an anathema to its enemies.

The experience of the Family Farm Policy Review in 1951 augurs ill for the present proposal, but invalidates none of the arguments advanced in its support. Whoever wins in November 1952, some major aspects of the political situation for the next four years will be laid down. Perhaps a new approach in land conservation and related programs will then be possible. How may this approach be achieved? What may be its chief organizational characteristics?

---

[14] "The Natural Sciences and Farm Planning," *Journal of Farm Economics*, Vol. XXIX, No. 1 (Proceedings Number, Feb. 1947), pp. 193 ff. Space is not available to provide details of the present proposal. That a new orientation is needed is suggested by the difficulty in estimating the effects of the SCS program; cf. *Hearings*, Agric. Approp., fiscal 1952, H. of R., Part 2, pp. 792–93, 802–3; note the importance of economic planning in all the examples presented in "Conservation Problems and Achievements on Selected Midwestern Farms," Special Circular 86, July 1951, Ohio Agricultural Experiment Station (North Central Regional Publication No. 23). Note the inclusion of the pilot farms and demonstration farms in the "Family Farm Policy Review: Provisional Report . . ." USDA, June 1951, pp. 3–4, 15, 25. See John D. Black, "Federal-State-Local Relations in Agriculture," National Planning Ass'n, Feb. 1950, pp. 40 ff., and also *The Rural Economy of New England*, Cambridge, Mass.: Harvard University Press, 1950.

THE VIRTUES OF NEGOTIATION

Recent history suggests that negotiation is the most promising means of getting a new approach in this area. None of the interests in agriculture have been able to succeed in unilateral action. So far, at least, Secretary Brannan's plan of 1949 has failed; and so has his Family Farm Policy Review of 1951. But the Hoover Commission's Task Force for Agriculture, in which land-grant college interests were heavily represented, also fell short of reorganizing the USDA in the interests of the colleges and their allies. The powerful American Farm Bureau has been least successful in its efforts in the land conservation area. This experience suggests a return to the approaches of the 1930's (until 1938, at least), when negotiation among the agricultural interests played an important part in formulating agricultural policy. Negotiation, however, needs to be informed by a conception of the public interest—a conception which goes beyond simple identification with the various group interests involved.

SUGGESTED REORGANIZATION

The problem is by no means merely the achievement of administrative efficiency. Also involved are the organization and control of political power, and the relationships of research and educational institutions to "action" agencies. Many highly organized group interests are concerned, and a stalemate may develop which will prevent the rather drastic realignment suggested. A further complication arises because on some of the proposals new legislation would be required.

Since space is not available to present various alternatives, only one line of action will be set forth. The initial step would be to transfer the functions of SCS, assigning the conservation survey to the Soil Survey of the Bureau of Plant Industry, Soils, and Agricultural Engineering and the experiment stations; the research and flood control investigations to the same Bureau, the Bureau of Agricultural Economics, and the experiment stations; and the activities in co-operation with farmers through soil conservation districts to the co-operative Extension Service.[15]

SCS functions at the farm level would be carried on by Extension, but a shift in emphasis would take place, so that the program would become one of farm and home planning. Presumably, many of the present SCS employees would transfer to the Extension farm and home planning program; however, as replacements in their ranks appeared, the policy would be to hire men trained especially in the economics of farm management so that the professional staff would reflect the changed direction of the program.[16]

The aim of the program should be to assist every farm in the country to develop a sound economic base; this is of the essence of agricultural adjustment. As pilot and demonstration farms were developed and means devised to facilitate the spread of the techniques and combinations widely among farmers—including that mastery of technology already mentioned—the need for close relationship to the PMA program would appear very clearly.

---

[15] No recommendation is offered here for the land utilization program. A problem is recognized respecting that part of flood control work which has to do with *applications* rather than surveys. To date, eleven watersheds are involved; the SCS expenditures approximate $6,000,000 annually. If SCS functions were transferred as indicated, the flood control watershed improvement program would be shifted to the research and educational agencies indicated; co-ordination would remain in the office of the Secretary. Cf. *Hearings*, Agric. Approp., fiscal 1952, H. of R., Part 2, pp. 749 ff.

[16] Present SCS personnel are chiefly engineers by training. *Hearings,* Agric. Approp., fiscal 1952, H. of R., Part 2, p. 793.

The assumption is that a major part of public policy for agriculture will continue to be price- or income-supporting measures, together with programs to assist agricultural adjustment toward a sounder economic footing. It is argued that the public interest will be served best if the aspect of ***adjustment*** in such programs is favored over the aspects of price support and production control. If so, the proposed heavy investment in farm and home planning should show the way and provide the means for agricultural adjustment. This statement does not imply that all agricultural adjustment has to be or ought to be made within agriculture. It is assumed that much adjustment will continue to be made by the movement of people off farms into industry and trade; nevertheless, an adjustment problem ***within*** agriculture remains.

ADMINISTRATION OF PAYMENTS

The chief point for relating the farm and home planning program to the adjustment program is in the administration of conservation payments. It is assumed that annual appropriations for such payments will continue. But several changes appear advisable. The initial step would be to divide the fund. One part would be available to reimburse farmers for specific performance of conservation practices listed in the current bulletins; this is the "open offer" to all qualifying farmers as the program now operates. The other part would be used to help defray whatever expenditures were needed to put a farm and home plan into effect. The object would be to shift the entire fund, over a period of years, to the second category, and it may well be that Congress should designate a time for this shift to be accomplished—say in seven years. Payments would then be made only to those farmers with farm and home plans showing a schedule of inputs—whether for conservation materials, land rehabilitation, provision of permanent improvements, acquisition of livestock, or machinery purchases. After payments had been shifted to carry out farm plans, individual farmers should be eligible for no more than five years of grants from the fund.

In addition, the writer would prefer that the fund be allocated to states and counties and eventually to farmers on some formula which would be in inverse proportion to per capita farm income. Such a shift might tend to encourage persons to remain in farming without adequate resources; but this would not need to occur if some criteria of reasonable economic size of farms could be agreed upon, with regional and local adaptations. It seems to the writer that the present allocation of funds to those who need the money least is unconscionable. To be sure, these farmers are, in a sense, custodians of an important social resource; but there are countless social resources which are not subsidized in this fashion. Should we, for example, subsidize the men of military age for maintaining physical fitness?

A delicate problem arises in administrative relationships for these proposals. On the one hand, it seems clear that the technical responsibility for farm and home planning should be vested in the research and educational agencies, as noted. On the other hand, these agencies are loath to administer, and stand accountable for, subsidy programs. At the same time, it seems vital to bring about an intimate relationship between the programs for farm and home planning and for agricultural adjustment. Perhaps a solution could be found in the establishment of a joint committee of the Extension Service and the local PMA organization. This committee would agree on the farmers who, having qualified with farm and home plans, would receive grants; it would also set the amounts of the grants.

How is political favoritism to be kept out of this kind of allocation? The answer may be found in creating a widely shared understanding of the objectives of the program, in developing accepted standards for the farm and home planning program, and in establishing effective co-operation between the Extension Service and the local PMA committees in allocating the funds.

THE COSTS

The program described could probably be put into effect for less than the present outlays. Presumably some administrative savings would be realized in consolidating the major part of SCS activities with the Extension Service. The opportunity for largest savings would appear in the PMA conservation program. In 1936–50, appropriations for this program totaled $5,342,800,000. In the proposed program an annual appropriation of $150,000,000 for adjustment payments might be planned for fifteen years. After a few years, Congress might well write a schedule of future appropriations which would taper off and culminate, say, in 1967. While no Congress can bind its successor, the provision of such a schedule would be advantageous. If a situation arose in which additional direct income aids for agriculture appeared advisable, they should not be confused with conservation or (preferably) adjustment payments. It would, in any event, be extremely interesting to see whether a democracy can plan a development of this sort, carry it through, and, after a period of years, end it.[17]

WHAT OF A ROUNDED PROGRAM FOR OTHER LAND?

The foregoing suggestions assume that land programs need to be designed in relationship to other relevant public activities and to the patterns of human purpose directly involved. What emerges is not one but many programs —as many as there are bona fide farms and ranches. Public programs should promote private efforts to improve farm family living on a conservation base—and thereby help stabilize an economically sound agriculture. There is also a tacit assumption that the program suggested would help to strengthen a pattern of family farming which contributes to democratic constitutionalism.

The preceding analysis for private agricultural lands is by no means all-inclusive. Some 250,000,000 acres, or 55 per cent of the potential timberland in continental United States, is in small holdings; it should produce 30 to 40 per cent of our future timber supply. Nearly half of this is in some 3,200,000 farm wood lots. It is assumed that the program advanced earlier would have the economic use of farm wood lots as an objective and thus would contribute to forestry policy.[18] It is also assumed that the program would have beneficial effects on flood control, especially in eastern watersheds, although conflict is possible between agriculture and hydroelectric power respecting water conservation policy. Similar assumptions may be made for the conservation of wildlife, although conflicts of interest among sportsmen, recreationists, and farmers will certainly continue to be matters of local vexation.

---

[17] This suggestion is to be distinguished from the "timetable" of soil conservation, criticized in *The Politics of Agriculture* (*op. cit.* note 1 *supra*), Chap. vi, Section 4. There is no timetable for agricultural adjustment; but there could well be a time *limit* on the specific means of adjustment employed in the agricultural conservation program of PMA.

[18] Cf. Luther H. Gulick, ***American Forest Policy*** (New York: Duell, Sloan, and Pearce, 1952), index under "small forest owner."

The largest block of other lands is in federal ownership or administration—457,600,000 acres in continental United States, or 24 per cent of the area. Four hundred and seven million acres of this is in the eleven western states, where the United States controls land that comprises 35 per cent of the acreage in Washington up to 85 per cent in Nevada. While several agencies share in the administration of western public land, the Forest Service of the United States Department of Agriculture is responsible for perhaps 35 per cent of it and the Bureau of Land Management (BLM) in the Department of the Interior, for some 40 per cent.[19]

Program development for western lands poses many problems, two of which may be briefly mentioned. First, the relationship between land and water is especially important. The President's Water Resources Policy Commission has proposed a *Water Policy for the American People*[20] which embraces multiple planning and development of resources on a grand scale. The commission emphasizes sedimentation control particularly in the West[21]—an emphasis which implies a strong case for co-ordinated planning, management, and development of land and water resources. Without attempting a systematic treatment of the numerous problems raised by such co-ordination, the writer would merely point up the following. Land management may easily be exaggerated as a means of controlling sedimentation,[22] and scientific standards for the extensive management of range lands are hard to formulate.[23] The easy assumption of the interrelatedness of land and water may prompt an uncritical acceptance of the need for consolidating the management of these different resources in one agency.[24] At the same time, the complete rejection of the idea of one agency to plan and administer the land and water resources of a region may sacrifice significant symbolic values. The tension between accepted obligations and actual accomplishments has been stimulated by the regional agency approach.[25]

---

[19] Marion Clawson, *Uncle Sam's Acres* (New York: Dodd, Mead, & Co., 1951), pp. 148–50.

[20] Volume 1 of the Commission's report. Vol. II is *Ten Rivers in America's Future;* Vol. III, *Water Resources Law.* A final report was made public on Feb. 17, 1952. The first three volumes were published in 1950. All are available at the Government Printing Office.

[21] Cf. Vol. II, pp. 13 (Columbia), 215–20 (Missouri), 297 ff. (Rio Grande), and 408 (Colorado).

[22] The reservoir of the Boysen Dam on the Big Horn River (Wyoming) will be depleted in an estimated fifty years by silt. Forty per cent of the silt apparently comes from one creek, which is only 5 per cent of the watershed; but only 10 per cent of the silt from this creek comes from range and irrigated lands. The rest comes from the stream bed and banks. *Ibid.*, Vol. II.

[23] See Reed W. Bailey, "Problems Ahead in Wildland Research," *Journal of Forestry,* Vol. 44, No. 11, Nov. 1946. Dr. Bailey is director of the Intermountain Forest and Range Experiment Station, Forest Service, Ogden, Utah. Research can develop "practical guides" for the wildland manager, apparently to supplement (but certainly not to replace) his experience and judgment. The implications of this brief article for management are profound.

[24] Charles McKinley, "The Valley Authority and Its Alternatives," *American Political Science Review,* Vol. XLIV, No. 3 (Sept. 1950), especially p. 617.

[25] Norman Wengert, "TVA—Symbol and Reality," *Journal of Politics,* Vol. XIII, No. 3, Aug. 1951.

Second, what of the proposal to transfer the Bureau of Land Management from the Department of the Interior to the Department of Agriculture? [26] Proponents argue that the public domain would be managed better in Agriculture. The BLM has been strapped for funds and has allegedly "virtually lost control of the range." [27] Many will agree that the activities concerned are now underfinanced and that the historical record of the Forest Service is better than land-management agencies of Interior can offer. Before the transfer is approved, however, two arguments should be carefully weighed. First, the vigorous leadership enjoyed by the BLM since 1948 might be given a few more years to demonstrate what it can do.[28] Second, the proposed consolidation would create an agency of considerable power. A careful study should be made of the amount of authority thus to be concentrated before this step is taken.[29]

---

[26] Proposed by the Hoover Commission's Task Force for Agriculture (see "Agriculture Activities," Appendix M, Jan. 1949), as well as by the Hoover Commission itself in its report "The Department of Agriculture," Feb. 1949. The proposal has been incorporated in S. 1149; see *Hearings,* S. 1149, 82d Cong., 1st sess., p. 15. Most of the organizations appearing favored the transfer, with the exception of the livestock groups. Cf. *ibid.,* pp. 535 ff.

[27] "Management of Public Land Resources," *Yale Law Journal,* March 1951; reprinted in *Hearings,* S. 1149 (previous note); but cf. Clawson, *op. cit.* note 19 *supra,* pp. 282–96. The Bureau of the Budget is currently studying the matter; *Hearings,* S. 1149, pp. 209 ff.

[28] The BLM has moved to meet some objections. Regarding BLM's failure to "adopt a long-range program of retention-dam construction, terracing, and stream-bank protection" (*Hearings,* S. 1149, p. 65), see BLM, "Rebuilding the Federal Range" (1951).

[29] The considerable power which becomes concentrated—or spearheaded—in public agencies is shown for the United States Engineering Department by Arthur Maass, *Muddy Waters,* Cambridge, Mass.: Harvard University Press, 1951, and for relevant agricultural agencies in the writer's *Politics of Agriculture, op. cit.* note 1 *supra.*

Charles M. Hardin, Ph.D., Chicago, Illinois, is associate professor of political science at the University of Chicago. He has taught at Harvard University and has lectured in a number of colleges of agriculture. He has been a consultant to the Tennessee Valley Authority (1948) and to the Secretary of Agriculture (1949). He is author of The Politics of Agriculture: Soil Conservation and the Struggle for Power in Rural America (1952) and of articles in professional journals.

The Work of the President's Water Resources Policy Commission

By ROBERT G. SNIDER

ON December 11, 1950, slightly more than eleven months after its establishment, the President's Water Resources Policy Commission presented the first of its three volumes. This document [1] was the product of the efforts of a Commission of seven members, working with a professional staff of seventeen, twenty-two consultants, and the periodic assistance of almost two hundred federal agency personnel.

Within approximately eight months this group had drawn and analyzed information from each federal agency involved with water in any way, from numerous agencies in each state and territory, from sixty colleges and universities, and from 196 private organizations and agencies. Eight meetings in various parts of the country elicited comment on water problems from about one-quarter of the two thousand people who attended. With this mass of information, the Commission proceeded to

> study, and make recommendations to the President with respect to, *Federal* responsibility for and participation in the development, utilization, and conservation of water resources, including related land uses and other public purposes to the extent that they are directly concerned with water resources. . . . give consideration in particular to (a) the extent and character of *Federal Government participation* in major water-resources programs, (b) an appraisal of the priority of water-resources programs from the standpoint of economic and social need, (c) criteria and standards for evaluating the feasibility of water-resources projects, and (d) desirable legislation or changes in existing legislation relating to the development, utilization and conservation of water resources.[2]

The Commission members were: Paul S. Burgess, dean, College of Agriculture, University of Arizona; Lewis Webster Jones, president, University of Arkansas; Samuel B. Morris, general manager, Metropolitan Water District, Los Angeles; Leland Olds, former chairman, Federal Power Commission; Roland R. Renne, president, Montana State College; Gilbert F. White, president, Haverford College; and Morris L. Cooke, consulting engineer, Philadelphia (chairman).

GROWTH OF WATER POLICY

Water, as a basic resource, has suffered from lack of man's understanding. Our easy acceptance of its availability in humid areas and our uncoordinated policies for its development in the arid regions suggest the casual treatment we have given it. Fragmentary federal water policy began as early as 1879 with the recognition of the relationship between navigation and flood control. In 1891, by authorizing the establishment of National Forests, the Congress recognized the connections between forest cover and flood prevention and stream flow control. Federal development of the waters of the West was authorized by the Reclamation Act of 1902, amplified in 1906. By 1907 congressional attention was being focused on the need for co-ordinating existing water agencies.[3] In appointing an Inland Waterways Commission that year to "evolve a comprehensive plan designed for benefit of the entire country," Theodore Roosevelt said:

---

[1] President's Water Resources Policy Commission, *A Water Policy for the American People,* Vol. I, Washington: Government Printing Office, 1950

[2] *Ibid.,* p. 309. Italics ours. It should be noted that primary emphasis is directed toward federal policy and participation.

> Every stream should be used to its utmost. No stream can be so used unless such use is planned for in advance. When such plans are made, we shall find that, instead of interfering, one use can often be made to assist another. Each river system, from its headwaters in the forest to its mouth on the coast, is a single unit and should be treated as such.[4]

It is this thesis that serves as one of the main points of the Commission's program.

In the last half-century there has been a growing awareness of the desirability of multipurpose development, and of treating entire river systems as wholes. But haphazard legal and administrative growth has left us without a comprehensive national water policy or a co-ordinated group of responsible agencies.

INCREASED USE CONTEMPLATED

The Commission based its report on the assumption of an expanding economy. The implications of this assumption are broad. In addition to our currently increasing rate of population growth, which may give us a national total of as much as 200–300 million by the year 2000, according to Joseph S. Davis,[5] our rate of water use has shown even more rapid growth. Between 1939 and 1949, according to a recent study, 2,252 industrial plants increased their water intake by an average of 36 per cent.[6] A national survey of groundwater problems, sponsored by the Conservation Foundation, points out that current use of water may be doubled within a few decades.[7]

This growth may call for extensive legal and administrative adjustments, but from the point of view of the water supply itself, there is ample room for such increased use. By way of illustration, it is interesting to note that of the total rainfall in the United States, approximately 30 per cent is runoff, available for man's use. But of that runoff, only 4 per cent is now "used" by man—a mere 14 per cent of that available to him.[8] Much of this is susceptible of reuse, often many times.

Thus, except in the arid West, water resources are, as far as gross quantities go, available for greatly expanded use, if the facilities and administrative machinery can be established to realize the potential in an equitable manner. To define what the role of the Federal Government should be in future development was the task of the Commission.

PRINCIPLES OF PLANNING

Federal water policy must be the result of creative joint effort by individuals as well as government at all levels. Early in its report, the Commission outlines the requirements of democratic planning:

> The American system succeeds only as it encourages initiative, enterprise, and a sense of responsibility for the common good. No "plan" can be acceptable which weakens or fails to use these qualities. The recommendations of this report do indeed envisage long-range plans for each river basin, and an over-all water resources plan for the Nation as a whole. But both in the detailed formulation of these plans and in

---

[3] *Op cit.* note 1, p 309

[4] *Ibid*, p. 296.

[5] Joseph S. Davis, "Our Changed Population Outlook and Its Significance," Address before Stanford Research Club, Nov. 14, 1951.

[6] *Water in Industry* (New York. National Association of Manufacturers and the Conservation Foundation, Dec. 1950), p 11.

[7] Harold E. Thomas, ***The Conservation of Ground Water*** (New York· McGraw-Hill Book Co, 1951), p 10

[8] President's Water Resources Policy Commission, *op. cit* note 1, p 177.

> their operation, individual farmers, workers, and businessmen, as well as agencies of local, State, and Federal Government, will play an indispensable and fully responsible part.
>
> The Federal Government is clearly charged with responsibility for safeguarding and developing our resources, but it is only one of the agencies involved. Its specific role is one of leadership—the provision of relevant scientific and economic information and co-ordination, as well as a public investment function on behalf of the entire Nation. These functions aid and supplement, but can never supplant, the work of local individuals and groups directly concerned.[9]

Further planning principles are set forth. Each regional plan should be comprehensive and co-ordinated, based on the concept of multiple use. Plans should arise from present or prospective requirements, and be designed to meet them on a regional, state, or local basis. In all, there is a body of recommendations on which general agreement exists—as the Water Policy Panel of the Engineers Joint Council notes.[10] Plans should be based on adequate data. Congress should create an independent board of review. The investment appraisal statement should be complete. Uniform procedures should be used by all agencies in estimating costs and benefits. Congress should provide a uniform national reimbursement policy and specify the principles to be applied. Reimbursement should be secured for direct benefits and for local secondary benefits. All levels of government—federal, state, and local—should participate in planning.

The Engineers Joint Council points out that "despite some references to local and state participation, *the emphasis in the report is almost universally on federal direction and control*."[11] And this is the general tenor of much of the criticism directed at the Commission's argument. But it should be noted that "the Commission favors full participation by the states to the extent that they accept the broad responsibility which goes with such participation,"[12] indicating, however, the problems of limited funds and inadequately trained personnel in state planning groups. That much remains to be done by the states themselves has been brought out during a study now being sponsored by the Conservation Foundation, conducted by the University of Pittsburgh Law School. Here, in a state generally acknowledged as "advanced" in conservation, some twenty state agencies, controlled and affected by 663 state and federal laws and regulations dealing with water in Pennsylvania, have never had the benefit of a compendium of these interrelated laws.

FINANCIAL FEASIBILITY

Another basic point which several critics question is the Commission's emphasis on financial feasibility as distinguished from economic feasibility. In developing recommendations for evaluation of projects, the Water Resources Policy Commission deals with the various effects of water resources programs on the economy, pointing out the significance of intangible as well as tangible benefits, and emphasizing social benefits of regional and national scope.

> The relationship between total costs and total returns would indicate the extent to which the program or project would be financially feasible.
>
> Financial feasibility has been urged by some as the determining factor in evaluation, that is, they believe that all water re-

---

[9] *Op. cit.* note 1, pp 7–8

[10] *A Water Policy for the United States* (New York: Engineers Joint Council, 1951), p. 2.

[11] *Ibid*, p. 3

[12] President's Water Resources Policy Commission, *op. cit.* note 1, p. 49.

> sources projects should be self-liquidating. This view implies that Federal agencies should seek out sound business opportunities wherever they may be found in the water resources field.
>
> The basic fallacy in such reasoning is that it seeks to transfer to public investments the limitations common to private investments. The Federal Government seeks to conserve and develop the Nation's natural resources for the general welfare and not for profit. Hence, financial feasibility is not the same as economic feasibility. Financial costs and returns should be considered in analysis, but financial feasibility alone should not determine the desirability of a program or project. For this reason the Commission is recommending that Congress eliminate the requirement that irrigation projects show financial feasibility.[13]

On the general principle evoked here, the Water Policy Panel of the Engineers Joint Council *"must record distinct disagreement."* Collective action for water conservation and control should be accomplished at the lowest governmental level practical. When collective action is taken through the Federal Government, the Council recommends as policy:

> First, to do those things which are essential to the national defense or otherwise of substantial benefit to all of the people throughout the nation; and
>
> Second, to aid in the financing of the cost of construction of works for the benefit of a limited number of people on terms equitable to all other citizens of the nation.
>
> In the discharge of the first function the Federal Government is acting as a trustee in the disbursement of tax revenues on a non-reimbursable basis for the general benefit. It follows that such expenditures should be made for those purposes which will produce the greatest benefits to the nation as a whole. This responsibility goes far beyond any determination of feasibility; it requires a determination of what is best, not merely what is good.
>
> In its performance of the second function the Federal Government is basically acting as a banker responsible for the soundness of his loans. It is fundamental to this function that such loans should be repaid with interest so long as there is a national debt and that the period of amortization should not exceed the useful life of the works. It is also fundamental to this function that those who benefit directly from the construction of such works for the conservation and control of water should repay all costs properly allocable to the production of such benefits; furthermore, where indirect benefits will accrue to a region in greater degree than to the nation as a whole, the people in that region should repay a like proportion of all costs not allocable to production of direct benefits.[14]

QUESTION OF FEDERAL CONTROL

Reporting to the Water Problems Section of the Commonwealth Club of California, Sinclair O. Harper, section chairman and former chief engineer of the United States Bureau of Reclamation, points out that the greatest justification for the trend toward federal control of water resources development lies in

> projects too large for state or local development; projects whose benefits are largely interstate or national, such as navigation and flood control; projects serving a number of purposes—irrigation, flood control, navigation, power, recreation, etc.—but unlikely to be developed by local or state agencies without federal subsidies.[15]

He further notes that under a 1940 Supreme Court ruling, federal authority may control virtually all major streams.[16] He also suggests the desirability for local agencies to obtain operative authority over their water projects, even to the extent of returning to the Federal Treasury all reimbursable project costs.

---

[13] *Op. cit* note 1, p. 59.

[14] *Principles of a Sound National Water Policy* (New York: Engineers Joint Council, July 1951), pp. 20–21.

[15] Sinclair O. Harper, "Water Development —Federal, State, Local Fields?" *The Commonwealth,* Vol. XXVI, Part Two (Sept. 24, 1951), p. 5.

[16] *Ibid.,* p. 6.

However, a poll of the members of the Commonwealth Club's Water Problems Section shows 43 per cent voting in favor of continuing the policy of federal *financing* of major water resource developments, although more than 95 per cent favor giving the Federal Government less responsibility in such developments.[17] This is indicative of the continued conflict which has hampered our water development to date—the attitude expressed as "Give us the federal funds, but let us spend them ourselves."

Much of the controversial nature of the Water Policy Commission's recommendations centers around the character and the extent of local and state participation in water resources development. The National Association of Manufacturers, for example, while commending the Commission for its thorough compilation of material for study of the problem, takes issue with any type of river basin development plan similar to the Tennessee Valley Authority.

> The Association again states its firm conviction that the American people have progressed, and will continue to progress and prosper better under the present system that depends to a maximum degree on individual initiative, resourcefulness, and responsibility, and self and local control, than they would under a socialistic government, the seeds of which are inherent in the Commission's proposals for basin-wide developments.[18]

To avoid such a situation, the NAM committee favors interstate compacts or intrastate conservancy or development boards. It may be pointed out here that some of the more noteworthy of these have in fact, despite their widely acclaimed grass-roots character, received most of their funds from federal sources.

RESPONSIBILITY AND CONTROL

David M. Guy, then manager of the Natural Resources Department of the Chamber of Commerce of the United States, dealing with the general water development problem, recognizes the connection between financial responsibility and control:

> In all development of water resources, it must be borne in mind that responsibility and control are inseparable. And to the extent that federal responsibility, financial or otherwise, is accepted, it goes without saying that there will be, and must be, a commensurate share of control. Financial responsibility without control is not tenable in private enterprise. It cannot be expected in government. Conversely the more financial responsibility the states and communities assume in river development, the less they will be troubled with federal intervention.[19]

This is perhaps the crux of the matter. Federal control should be kept at a minimum not only because of American tradition (a strong point in the NAM and the Edison Electric Institute arguments against the Commission's recommendations) but also because local participation, particularly financial, is likely to make the direct beneficiaries insist on the most efficient utilization of their funds.

A COMPLEX SITUATION

But individual developments locally planned are unlikely to provide the degree of co-ordination necessary to develop the integrated system required for wise use of the renewable resources in areas linked by a common water course. Treatment of these broad areas is complex and difficult. It is relatively easy to propose a particular dam. It is definite as to location and objectives and cost. And on this information the Congress acts. However, a dam is only a part of the whole development. Without upstream treatment, silt deposition may destroy the investment; or a dam allowing for stream flow peaks, which might be susceptible of reduction by land treatment, may require unreasonable expenditures. Without integration of various developments, the river is a collection of unconnected fragments. Over-all planning for its use, taking into account local needs, is imperative.

---

[17] *Ibid.*, p. 15.

[18] Recommendations of the Committee on Conservation of Renewable Natural Resources to the September 1951 NAM Board of Directors Meeting (mimeo.).

[19] "Background for Development of Water Problems and Policy" (Washington: Chamber of Commerce of the U. S., Oct. 23, 1951, mimeo.), p. 11.

The widely varying laws dealing with federal (and state) water development help to complicate an already complex problem. Arthur Maass, a careful student of federal water administration, points out the need for a basic law setting forth detailed standards and criteria for determining priorities among proposed water development projects.[20] Uniform standards would go a long way toward overcoming the inequities which now permit competition between federal agencies in water development. This competition does much to bring about the conflict which arises when local groups on the one hand urge local development of water resources, and on the other hand turn to the Federal Government—and nonbeneficiary taxpayers—to foot the bill.

PROPOSED FEDERAL ORGANIZATION

To put its recommendations into action, the Commission has presented a proposed bill[21] to the President. At this writing, no action has been taken, nor has it, or any like bill, been presented to the Congress, although various agencies and the Bureau of the Budget have been studying the proposal.

The legislation outlines in general terms the character of federal organization for water resources development and sets up commissions in river basins in composition suggestive of the informal Inter-Agency River Basin Committees. These commissions are to consist of nine members, representing the Corps of Engineers, the Departments of Interior, Agriculture, and Commerce, the United States Public Health Service, and the Federal Power Commission, two nongovernmental representatives elected by a local advisory committee, and a presidentially appointed chairman. The last three must be residents of the region. These commissions are required to prepare a long-range program for *federal* participation in the region's resource development, co-ordinate and require co-operative *federal* resource development functions, and recommend specific legislative changes to achieve the objectives of the act.

To advise and serve as liaison with the public, the bill provides that the governors of states within an established river basin shall each appoint a personal representative and elect three representatives for the basin from agriculture, from business, from labor, and from fish, wildlife, and recreational interests, and a sufficient number from local governments to complete the committee's membership of twenty-five. These representatives are responsible to consult with their commission in the long-range program planning, to assist in co-ordination of commission and state and local resource developments, and to help in negotiation of repayment agreements from state and local indirect beneficiaries.

---

[20] "Congress and Water Resources," *American Political Science Review*, Vol XLIV, No. 3 (Sept. 1950), pp. 592–93

[21] Draft of a Water Resources Act of 1951, President's Water Resources Policy Commission, Feb 1951, Released Feb. 11, 1952 (processed).

In addition, a five-man Federal Board of Review is to co-ordinate the operations of the various basin commissions, examine the relation of commission proposals to costs, benefits, and long-range programs, and, after consideration of the various factors involved, make recommendations through the President to the Congress. These recommendations, under the proposed bill, would serve as a guide to congressional action.

OUTWORKINGS OF PROPOSALS

In this Board of Review one finds for the first time in federal organization an agency which could, for example, weigh in national terms the merits of expensive water developments in the arid West against those in longer-established agricultural regions. Such a board could be responsive to local claims for well-planned, locally financed developments as part of integrated programs. But most important, this board has the opportunity of recommending federal expenditure on a rational basis and opposing pork-barrel efforts. With wisdom and objectivity, it should be a major force in long-range resource conservation. Its membership and the precepts under which it operates are of vital importance to the nation's welfare.

In the proposed legislation the possibilty for local developments (private or public) to arise independent of a basin-wide plan is not dealt with specifically, but there appears to be no major barrier to private and local initiative. Local participation is provided for by advisory committees and by the system of negotiated repayment agreements with state and local beneficiaries, including conservancy districts. The legislation recommended by the Water Resources Policy Commission offers a brake on unconsidered or ill-conceived programs of individual pressure groups. It provides a basis for uniform standards for each agency's projects, and a review of interrelated problems.

The submission through the Commission and the Board of Review of the various agency budgets for their resource development activities would favor a co-ordination of effort which has been grievously lacking. Instead of the artificial device of budgeting in terms of a given agency's program throughout the country, priorities for balanced development in specific areas by all agencies could be established. The needs of one agency would be functionally linked to those of others.

The device of reimbursement, by others as well as by direct beneficiaries, recognizes the merit of local participation. Since agreements must be negotiated, rather than taxes levied on the entire body politic, there is additional control over ill-conceived projects, and promise of a more equitable basis for local assumption of financial responsibility.

Uniform accounting systems, including a weighing of nondollar advantages and disadvantages, would make it possible to consider in comparable terms the economic feasibility of various projects in a development program. In all, the draft bill meets a number of important requirements for effective operation.

As the Commission says, "There is a sobering finality in the construction of a river basin development. . . ." A Board of Review, a group of river basin commissions, and local advisory groups can lay plans with well-rounded objectives for the consideration of the people involved, local residents and distant taxpayers. Informed, deliberate action by individuals immediately concerned with the development and use of resources is necessary in an expanding economy. Full utilization of resources must take into account their interdependence; some body must be charged with the responsibility of interrelating their development on a scale commensurate with the complex values of these interrelated resources.

Robert G. Snider, New York City, is director of research and vice president of the Conservation Foundation.

Water: West

By Morris E. Garnsey [1]

Conservation is one of the least popular words in any lexicon in this country. I regret that we didn't name it development. Since it is a land-use problem, development would be a more accurate label, because conservation suggests to the fisherman that we don't want him to catch any fish, to the hunter that we don't want him to hunt, and to the axman that we don't want him to cut. All of this is wrong. If you say development you've got everybody on your side even if development is the most destructive thing in the world.[2]

THESE words offered sound advice when they were written fourteen years ago by Tom Wallace, one of the great champions of conservation in America. Today they have an added ring of prophecy about them—at least as far as the great American West is concerned; for the idea of development appeals to the westerner, not only because of its affinity with the traditional expansionist views of the frontiersman, but also because of an increasing realization among westerners that the new wave of population growth in the United States is certain to result in a relatively large acceleration of economic activity throughout the western United States during the years ahead.

Western Population Increase

It now seems reasonable to estimate that the population of continental United States will reach 200 million by 1975—an increase of approximately one-third in twenty-five years. Should this be the case, the rate of increase of the population of the seventeen western states is certain to exceed the national increase by a substantial margin. Indeed, it is not inconceivable that this group of states, which accounted for 22.6 per cent of total United States population in 1950, should provide residence for as much as 30 to 33⅓ per cent of the population in 1975. This would mean a rise in western population from 34 million in 1950 to approximately 60 to 65 million in 1975. Thus, when national population grows by 33⅓ per cent, the population of the West is likely to rise by 75 to 95 per cent!

Obviously, such a large growth of western population would require a heavy migration to the region from the rest of the United States. However, there is good reason to expect that such a migration will take place. The westward movement has accelerated when total population has been rising rapidly, and decelerated when population increase has been more moderate. It is relevant to note that the center of population moved farther west between 1941 and 1950 than in any previous decade since 1881–90.

Historic parallel is in itself not a conclusive basis for forecasting. Much more significant is the fact that the westward movement is now, as in the past, closely related to the need for bringing new land under cultivation in order to feed a growing number if persons. By 1975 the United States should have added at least 100 million acres of cropland to the approximately 400 million acres in use in 1950 in order to serve the extra 50 million persons then at the nation's dinner table. Much of this land must come from the West, and nearly all of the western share must be irrigated land. According to Wesley R. Nelson, assistant commissioner of reclamation, there are nearly 50 million acres of potentially irrigable land in the seventeen western states which under cultivation would yield crops equivalent to the produce of 100–150 million acres of average nonirrigated cropland.[8] Thus, the West could, in a pinch, supply nearly all the additional cropland needed by this country in 1975.

---

[1] I wish to acknowledge with thanks the contribution to this article of the students in my Graduate Seminar in Regional Economics, both in the preparation of the following research papers and in general discussion of water resources development in the West: H. L. Bacon, "The Central Valley of California"; R. L. Bingham, "Water: Key to the Future in the Colorado River Basin"; R. L. Hasse, "The Missouri Valley"; W. G. Neahr, "The Upper Arkansas River Basin"; J. V. Walther, "The Rio Grande River Basin"; and J. E. Wood, "Conservation of Water in the Columbia River Basin."

[2] Tom Wallace, "Getting Publicity for Conservation," condensed from *Forestry News Digest* and appearing in *Conservation*, Vol. 5 (Jan.–Feb. 1939), pp. 30–31.

In addition, the West could supply most of the other resources required by a larger population, particularly mineral fuels and fertilizers, forest products, and hydroelectric power. In short, most of the unutilized natural resources of the United States are to be found in the West, and it is in the West that many of our new citizens may be expected to locate.

TECHNOLOGICAL POSSIBILITIES

Of course, it should be recognized that the precise extent and character of western development will not be determined simply by the direct pressure of population, but will be significantly affected also by the nature of the technological and social innovations which may be expected to accompany our imminent population upsurge. In the area of technology, three possibilities may be mentioned.

First, if Krilium turns out to be as effective for soil-rebuilding as its discoverers promise, much of the new acreage to be brought under cultivation may be found in the submarginal lands of the United States east of the 20-inch rainfall line.

On the other hand, if the technique of controlled precipitation through cloud-seeding develops rapidly, western expansion will be greatly facilitated. At the moment, the potentialities of cloud-seeding are being debated vigorously, with the skeptics having a bit the best of it. Nevertheless, the continued improvement of new techniques is a commonplace of our civilization. It seems a fair judgment to say that in 1952 the technique of cloud-seeding is about as far advanced as was that of the airplane when the Wright brothers flew at Kitty Hawk. If the analogy holds, the controlled increase of the snow pack in the high mountains as a means of regulating the supply of irrigation water throughout the West ought to be commonplace by 1975; while in certain areas the control of precipitation for direct application to crops and pasture would be regularly practiced.

The third technological factor of significance for the future of land and water development in the West does not involve substantial innovation, but does require an immense extension of existing techniques, together with their refinement and adaptation to diverse circumstances. This is the diversion of water from where it happens to flow by virtue of natural forces to wherever it can be used most efficiently. Such transfers of water involve the construction of dams, reservoirs, canals, and hydroelectric pumping plants on a very large scale. Certainly the Bureau of Reclamation could not speak of "50 million potentially irrigable" acres of western land if it did not assume the fullest use of facilities for the storage and transfer of water on every natural stream of any consequence throughout the West. Indeed, it is well known that a water utilization program of great magnitude is already under construction or survey in each of the major drainage basins of the West. It is from this technique of storage and transfer that we may expect most of the more immediate expansion of land and water resource utilization throughout the seventeen western states.

---

[8] Wesley R. Nelson, *Water and Our Future* (U. S. Dept. of Interior, Bureau of Reclamation), p. 7. An extension and revision of remarks made at a symposium on "Hydrodynamics in Modern Technology" at the Massachusetts Institute of Technology, June 4–6, 1951.

HINDERING FACTORS

However, the rate of economic expansion in the West will depend not only upon technology but also upon the ease of adaptation of social institutions to changes in the economic and technological environment. It is here that we may introduce into our discussion a consideration of the problem of water (and land) conservation in the West. For while it seems inevitable that there will be a large degree of resources development in the West for the reasons just given, it is by no means certain that this development will be accompanied by the employment of practices and techniques of conservation on an equally large scale.

Not all the people of the West regard conservation and development as integral parts of the same process, as Tom Wallace would have us do. There is a sizable minority of standpat western "conservationists" who apparently would prefer to preserve much of the region in a primitive state, unpolluted by settlers and tourists. There is an even stronger minority who, as Wallace indicated, favor development as long as they can equate it with the unregulated private destruction of the resource base.

The western conservationist's first task, therefore, is to persuade these two aggressive minorities of the cogency of the majority view—that conservation and development must go hand in hand, and that a sound program for the utilization of resources over time is most easily conceived and implemented in a period, such as that just ahead, when new resources are being brought into employment and old ones are being utilized more intensively than before. Nevertheless, it is not likely that the mere use of exhortation would result in the conversion of the minorities to a sound conservationist point of view. Persuasiveness should rather take the form of the creation of a well-conceived policy and a carefully thought-out program for the future development and conservation of the West's water resources—a policy and program which could not ignore the values of recreation and open space, nor deny to the individual the opportunity to develop resources for private profit.

POLICY AND PRACTICE

Fortunately, there has been rapid progress in the formulation of water policy in the recent past. The sixty-eight-point declaration of policy published by the President's Water Resources Policy Commission in December 1950 gives us for the first time a broad, clear-cut concept of the specific policies which must be implemented by the American people if we are to develop our resources successfully and arrest their all too rapid destruction. The emphasis on basin-wide, multiple-purpose resource planning by the Commission is particularly helpful, while its recommendations concerning the evaluation, financing, and reimbursement features of development programs go far toward achieving the ultimate solutions to these knotty problems. It is true that some of the Commission's recommendations are controversial, and are not acceptable to many who are seriously concerned with conservation and development. Nevertheless, the major recommendations deserve universal approbation, and, for the West, the Report of the Commission is not only valuable but also exceedingly well timed.

Nevertheless, declarations of policy cannot in themselves stop erosion, control floods, or generate hydroelectric power. Our policies now must be implemented by the formulation of effective programs and the drafting of adequate plans—particularly in the field of conservation. For at the present time conservation planning in the West is lagging behind development projects, and conservation practice is lagging even further behind current development. Both planning and action are severely handicapped by inadequate local participation and by jurisdictional disputes among federal agencies and state governments—in short, by the failure of social institutions to keep pace with technological change or with the growing national demand for food and fibers.

THE RIO GRANDE BASIN

Perhaps the most appalling conservation situation is in the Rio Grande Basin, an area of severe water shortage, already suffering from advanced and serious erosion damage. This past and present destruction of the soil-water resource base has resulted from the short-run exploitation of range lands and the misuse of surface and ground-water supplies. The situation is further complicated by a heterogeneous cultural background, and the restricted economic opportunities available to most of the Spanish-American population. In many areas farms have been so divided and redivided that a surplus agricultural population is crowded on acreages too small even to support their operators, let alone finance the expensive measures necessary for the recovery of the basin. In addition, high-value irrigation farming cannot be expanded because there is no additional water available. In fact, 20 per cent of the presently irrigated two million acres should be retired.[4] Here in the agricultural sector of the Rio Grande economy, Malthus' dire predictions of population pressure on a limited resource base seem nearer realization than anywhere else in this country.

The major conservation problem of this basin is the rehabilitation of deteriorating water and soil resources. As in most of the western river basins, the soil-water relationship of the Rio Grande Basin is extremely precarious even under natural conditions. Man has accelerated the destructive forces of nature, which now produce barren lands and rivers clogged with silt. As a consequence, even the rehabilitation outlook is discouraging, because effective conservation is difficult and expensive after so long a period of misuse.

Yet something must be done. The Rio Grande Basin can make an important contribution to the national economy both culturally and materially if its water and soil resources are well managed. A balanced program which includes provision for dams, watershed rehabilitation, and an appeal to the grass-roots farmer is a must for this basin.

---

[4] Report of the President's Water Resources Policy Commission, Vol. II, *Ten Rivers in America's Future* (Washington: Government Printing Office, 1950), pp. 306–307.

THE COLORADO RIVER BASIN

The Colorado River Basin also faces problems of water scarcity, but in a different context. Water is scarce, but this scarcity is potential rather than existing. All possible uses of the water of the Colorado River would require 25 per cent more water than is available; yet present depletion is only approximately 44 per cent of the water supply.[5] Thus, the future holds relatively bright prospects for the Colorado River Basin *if* an adequate program of conservation and development is put into effect.

Here again it must be recognized that soil and water are interdependent. If conservation is to be emphasized, resource development must be of a long-run and sustained-yield nature. It cannot be too heavily underscored that, for a sustained-yield type of water resources development, adequate attention must be given to range management and erosion control. Indeed, aside from the damaging effects of severe erosion on land, irrigation enterprises, and hydroelectric facilities, erosion also damages the most efficient natural reservoir —storage as ground water. The universal importance of ground water for irrigation is strongly emphasized in the Colorado River Basin, particularly in Arizona, where 90 per cent of the irrigated land receives all or most of its water supply from ground water pumped from wells.[6]

The Colorado River Basin also has industrial possibilities which should be encouraged by further development of hydroelectric power capacity. This source of energy production can be increased at least three times, from a present installed capacity of approximately 3 million kilowatts to an ultimate capacity of about 9 million kilowatts.

However, before substantial progress can be realized within this basin, serious administrative problems must be solved. We will find again and again throughout most of the West that although the physical techniques for water development and conservation are available, the social and administrative techniques for applying scientific knowledge to the achievement of maximum welfare are in dispute. In the Colorado River Basin this dispute takes the form of interstate conflict. In the upper basin, administrative progress has been accomplished through the creation of the Upper Colorado River Commission, an interstate compact to co-ordinate state water resource development. But in the lower basin, conflict between Arizona and California over water apportionment continues, and consequently development is retarded.

THE MISSOURI RIVER BASIN

The Missouri River Basin offers another example of administrative conflict which has slowed development and retarded efforts to solve conservation problems similar to those of the Colorado River Basin. Here too there exists a relative water shortage—not enough water for all projects possible. In addition to being limited in quantity, water in the Missouri Basin is variable in quality and poorly distributed. These facts, together with the large size of the area and limited mineral resources, have been largely responsible for a scattered population and lack of industrialization.

---

[5] U. S Congress, *The Colorado River,* H. Doc. 419, 80th Cong, 1st sess. (Washington: Government Printing Office, 1947), p. 14. These estimates include allowances for export of as much as three million acre-feet to other basins, although export on this scale would necessarily eliminate some of the potential uses within the basin.

[6] Department of Commerce, Bureau of the Census, "Preliminary 1950 Census of Agriculture," series IR 50-1, Jan. 14, 1952.

On the Missouri, as on most western rivers of uneven regime, man must control the flow of rivers by storing excess water for later use. With a complete water control and development program for the basin, hydroelectric power capacity can be increased approximately nine times, to over 9 million kilowatts; and the present irrigation of 5 million acres of land can be doubled. However, no complete water control and development program exists at the present time, largely because of the conflict of aims and interests which exists between the Bureau of Reclamation and the Army Engineers. Neither the Pick-Sloan Plan nor the Inter-Agency Basin Committee has succeeded in developing a basin-wide, multiple-purpose program for the Missouri. If it proves impossible to create a Missouri Valley Authority, the recent proposal of the Council of State Governments should be seriously considered.[7] Against the dominance of federal authority, this proposal would encourage more state and local participation by setting up a policy board and an operating agency deriving their powers from an interstate compact.

The Missouri Basin also offers a most promising field for the extension of the rapidly growing watershed association movement. Because of the basin's size and diversity, the attack on conservation and development problems should be broken down into sub-basin units. The dominance of agriculture in this region and the prevalence of habits of co-operation among the farmers of the Missouri Valley also point to the success of a conservation program administered on the basis of local participation.

THE CENTRAL VALLEY

The interagency conflict between the Bureau of Reclamation and the Army Engineers has not stopped at the boundaries of the Missouri Basin. The conflict has been even more severe in the Central Valley of California, where competition between these two federal agencies for support both in the valley and in Congress has resulted in development by political pressure. In the meantime, the Central Valley has suffered prolonged delay in securing an integrated program of development which will meet its conservation needs.

These needs are somewhat different from those in river basins where extreme water shortage prevails. There is plenty of water for all areas of the Central Valley, provided it is properly distributed. More water than can be utilized originates in the northern sector of the valley, while there is not enough water in the southern portion. To alleviate this particular shortage, the Bureau of Reclamation has proposed an elaborate network of pumps and canals to make surplus waters of the north "run uphill" to the irrigable acres of the southern basin. This water development program would cut water losses in the Central Valley from over 9 million to 1.5 million acre-feet per year, and at the same time increase the hydroelectric power output by four times and raise the irrigable acreage by 50 per cent.[8] The economy of the region must expand in order to provide adequate economic opportunity for its present and growing population. Much of this expansion depends on the utilization of water which now flows unchecked into the Pacific.

---

[7] According to the *Denver Post*, Section E, p. 1, Feb. 24, 1952. A rough draft of this proposal for an administrative board has been developed by Elton McQuery, assistant director of the Council of State Governments Under his plan each state would have one representative and one vote Also, the Federal Government would have one representative possessing one vote for each state.

[8] Report of the President's Water Resources Policy Commission, *op. cit.*, pp. 81–161.

In the Central Valley, as in the other basins, the conservation aspect of development has been neglected for short-run gain. The exploitive use of ground water has seriously damaged and reduced the flow of this valuable resource. The implementation of land treatment programs and ground-water conservation measures has proceeded at a very slow pace, with only about 10 per cent of the valley's farms and ranches included in Soil Conservation Districts.[9] Once more we find that control of water resources has begun only after the water has reached the river with consequent use of expensive and elaborate control structures. Dams and reservoirs are necessary and useful instruments of water resource development, but their full effectiveness will not be realized in the Central Valley as long as the region's water program lacks a proper balance between conservation and development.

THE ARKANSAS-WHITE-RED BASIN

Now for a brief look at the Arkansas-White-Red River Basin. It has been said that if this river system could be made to flow in a circle, the prospects of water supply would be infinitely more hopeful. The situation again is a maldistribution of water. The lower basin, situated in a more humid climate, has more water than can be profitably put to use. Additional irrigation demands are not important in the agricultural economy, because of adequate rainfall; and hydroelectric power, supplying less than 10 per cent of the power demand, is also relatively unimportant.

However, in the upper basin the water supply is chronically inadequate. The problem cannot be solved simply by the better use of existing water supplies, important as better use may be. The paramount need is to secure more water by transmontane diversions from the Colorado River Basin. Yet even with this possibility the water supply problems of the Upper Arkansas will not be solved. The possibilities of diversion from the Upper Colorado River Basin are limited, and most of the water which could be diverted into the Arkansas Valley will be needed for municipal water supplies there. In addition, the present provisions of the Colorado River Compact restrict the use of the diverted water to the boundaries of the state of Colorado. Therefore, although irrigation is very important in the upper basin, little expansion in this field is anticipated. On the other hand, hydroelectric power could be increased by approximately eight times, to a capacity of almost 5 million kilowatts.

Yet, despite these handicaps, the Arkansas-White-Red Basin does offer us the one contemporary example of an outstanding social and administrative attempt to solve the common problem. The principles of multiple-purpose, integrated, basin-wide development are the foundation of development here largely because the AWRB Inter-Agency Committee has been set up ***in advance*** of the formulation of unilateral plans by separate agencies or by the construction of major works.

THE COLUMBIA RIVER BASIN

Last to be discussed in this survey of river basin water needs, shortages, and potentialities is the mighty Columbia River and its surrounding basin. Here no water shortage is faced. Only a relatively small part of the total discharge can be expected to be utilized for irrigation. The water supply is so large in the Columbia River Basin that more than half of the total water discharged from western streams flows to the sea from the Columbia River and from the Washington and Oregon coast and Puget Sound tributaries. Water is the basin's most valuable resource, and the irrigated crops and electric power which can be produced from it affect the relative values of every other resource in the region.

---

[9] *Ibid.*

Water development potentialities of the basin include the doubling of the irrigated acreage and a tenfold increase in the production of hydroelectric power. Electricity is the only energy resource of importance in the region; and with complete development, the Columbia River Basin would possess 40 per cent of the hydroelectric capacity of the entire United States.[10]

Also because of the existence of so much surplus water, unconsumed by the generation of hydroelectric energy, tremendous possibilities exist for the alleviation of deficiencies elsewhere. Transmontane diversions to Nevada and Southern California are technologically possible, and if carried out would substantially reduce the demand of the Los Angeles area for Colorado River water. In a very real sense, the Columbia Basin is the outstanding example of an interbasin maldistribution of water. If social and political developments can keep pace with technological improvements, some 50 million acre-feet of water can be made available for export to croplands in other basins. Conservationists should be the first to recognize the desirability of creating a social framework within which to apply our technology for the purpose of improving human welfare.

In terms of land management, the Columbia Basin is not superior to other western basins, in spite of its relatively greater development of water resources. The conservation deficiencies present in other basins are also present in various degrees in the Columbia Basin. Watershed management is inadequate, and irrigated lands are not always efficiently operated. Forest conservation also needs extension, not only to provide a continuous flow of forest products, but also to protect vulunerable watersheds.

AN URGENT SITUATION

What may we conclude from this brief survey of the water resources of the West? Basin by basin and in the aggregate, the practice of conservation is not sufficient to prevent the continued destruction of the land and water resources of the West. Nor do present plans for future development include a sufficient emphasis on the integration of conservation techniques with development projects. At the same time, both development and conservation programs are seriously handicapped by administrative deficiencies arising out of jurisdictional rivalries and inadequate local participation.

This situation exists, moreover, at the very moment when the West is facing an increased demand for land and water unparalleled since the original settlement of the region. If this demand is to be met without a repetition of the ruthless exploitation of the last century, new concepts must be popularized and new procedures adopted without delay. Valley authorities modeled upon, if not duplicating, the Tennessee Valley Authority should be created at once in each of the six great basins of the West. Soil Conservation Districts should be multiplied and watershed associations created as rapidly as possible. From these authorities and associations should come project studies and priority lists, plans for local and national financing of conservation projects, and a barrage of education for conservation worthy of a Wallace or a Pinchot. Without such action, the desert lands of the West will encroach upon a million more acres of useful land, and flooding streams will flow muddy to the sea. With such action, our children will arise up and call us blessed.

---

[10] Department of Agriculture, *Irrigation Agriculture in the West* (Washington: Government Printing Office, 1948), p. 22.

Morris E. Garnsey, Ph.D., Boulder, Colorado, is professor of economics at the University of Colorado, and a member of the Committee on Southwest Economy created by the President's Council of Economic Advisors. He is vice chairman and public member of Regional Wage Stabilization Board, Region 11, and from 1941 to 1943 he served as consultant for the National Resources Planning Board. He is author of America's New Frontier and various articles on regional economics.

Water Supply—The Industrial East

By STEPHEN BERGEN

> To illustrate the importance of water supply to human communities I should be obliged to have recourse to commonplaces, or else to the lays of the poets, who from earliest antiquity have glorified water. Water is necessary, paramount, vital. . . . No one will deny this, and yet. . . . One is really astounded to see what still remains to be done in every country in the world, even in the most advanced, in the matter of water supply as well as in the no less important matter of sanitary arrangements.[1]

IF one of the jobs of an economist is to promote the most desirable allocation of limited resources, he will find much to interest him in questions of water supply and in the natural and man-made conditions affecting its availability. For with growing national needs, the supply of good water is becoming limited in various respects in a number of places. Abundant natural water sources have made possible the development of industrialized and heavily populated areas east of the Mississippi. There is no doubt that these sources are generally so ample that they will support much further growth. But in highly developed areas of the East problems of providing enough water are demanding the attention of many communities and industries.

The challenge to communities, whether large industrial and commercial centers or agricultural areas making increasing use of supplemental irrigation, is not only one of engineering. Water in the East is becoming politics and also is entering the courts,[2] thus assuming a role long familiar in semiarid regions of the West. Along with more exacting regulation of water use and disposal by established governmental units, increasing and often conflicting water uses are begetting new forms of political association, such as interstate agencies and watershed organizations. For the use of a water source will involve the interests of all who depend on it. When a number of communities take water from and put wastes into the same river, clearly some sort of joint regulation of use will be necessary as the need for water increases.

THE WATERSHED IS THE BASIC UNIT

This community of interest is related to the fact that the natural land unit which continuously delivers and disposes of our water supplies is the watershed (or drainage basin). Large or small, it is the natural basis for many of the measuring and analytical operations—for example, stream gauging and sediment sampling—which aid in determining the quantity and quality of water available for use in a particular locality.

Because it is a naturally bounded unit, a watershed is the logical basis for scientific and engineering study and for harmonizing the activities of interdependent water users. This is well illustrated by a stream-analysis research project under way at the University of Michigan.[3] This project includes studies to determine the self-purifying capacities of individual streams on which pulp and paper mills are or may be located. The capacity of individual streams to purify themselves of pollution loads by natural processes varies partly with their flow. In general, the greater the stream flow, the greater the pollution load that may be safely introduced into and diluted by the stream. The flow of the stream depends, in turn, upon rainfall in the basin, which may be abnormally low in certain years.

---

[1] A. Achten, *Water Supply and Sewerage* (Report of International Union of Local Authorities, The Hague, 1951), p. 7.

[2] In 1951 the United States Supreme Court upheld the right of West Virginia to join an eight-state compact, the Ohio River Valley Sanitation Commission, created to deal with pollution problems of the basin In its decision the Court recognized "that they were faced with one of the problems of government that are defined by natural rather than political boundaries" *New York Times,* April 11, 1951.

> Dry-weather flow varies radically from river to river and year to year and each drainage has its own peculiar pattern. The prediction of drought severity for a particular river can, however, be accomplished by modern statistical analysis. As this project's researches continue, the hydrologic studies consistently emphasize the dominant role exercised by drought probabilities and the necessity for giving that factor major consideration in the establishment of stream [quality] standards and programs of stream improvement.

In other words, rainfall over its entire watershed will govern in part the use of a stream by a particular plant for waste disposal.

THE NATURAL WATER SUPPLY

The natural water supply in the eastern part of the country is generous. East of the Mississippi the climate is humid. Precipitation (rain and snow), the ultimate source of all our water, ranges from an annual minimum of about 30 inches in the Great Lakes region to as high as 60 inches in parts of the Gulf coast and the tip of Florida. (There is an "island" of very heavy precipitation—up to 80 inches—roughly at the junction of Georgia with North and South Carolina.)[4] Precipitation is the gross supply, and only part of it is available for our use. The water that drains from the land into creeks and rivers during and after precipitation is called runoff. It has been defined as "a residual of rainfall after Nature's take—that is, after the persistent demands of evaporation from land and transpiration from vegetation have been supplied."[5] This remainder represents the total quantity of water available for development in streams and ground-water basins.

The amount of runoff in the East varies of course from place to place and from year to year, and reflects the amount of precipitation, the effect of temperature upon rates of evaporation and of transpiration by vegetation, and effects of geology and topography. Measured in inches depth over drainage areas, the average annual runoff ranges from 10 to 15 inches in the Great Lakes region, 20 to 40 inches along the Appalachians and in the Northeast, and 10 to 15 inches along the eastern Coastal Plain south of Maryland.[6] These bare figures take on more meaning in relation to estimates of the comparatively small quantity of water used by man. For the country as a whole, the average annual precipitation is about 30 inches, about 21.5 inches of which returns to the atmosphere, leaving an average runoff of about 8.5 inches.[7] It has been estimated that less than 1 inch of this water is intercepted and used in passage.

---

[3] National Council for Stream Improvement (of the Pulp, Paper and Paperboard Industries). This project is part of a research program sponsored by the council concerned with waste problems of the industry. The following quotation is taken from p. 13 of the 1951 Annual Report

[4] U. S Department of Agriculture, "Climate and Man," 1941 *Yearbook of Agriculture* (Washington Government Printing Office), p. 711

[5] W G. Langbein and others, *Annual Runoff in the United States,* U. S. Geological Survey Circular 52, p. 1.

[6] *Ibid.,* Plate 1.

THE LOCAL CONDITIONS

These broad average relationships are cited merely to illustrate that we use a very small part of the water running off to the ocean. They are suggestive, but need certain qualifications. Water is really not permanently available until developed by means of dams or wells, pumping facilities, and a distribution system. While the total quantity of water available, measured on an over-all basis for a large watershed, may be ample in relation to total demand, local conditions are extremely pertinent, and often limiting, in developing a supply for a particular community at reasonable cost. It is the relation of local demand to local sources that governs, granted that the amount of good water available to a downstream user will often be affected by use and waste-disposal practices upstream. The practical question is one of determining the dependable supply offered by perhaps several local sources,[8] and of designing facilities on a scale with local water needs.

Thus, many "shortages" of water widely reported in the last few years are not due primarily to drought or to shrinking of natural supplies. They are often due rather to present inadequate knowledge or exploitation of sources locally available, or to rapid increases or concentration of demand that strains existing water supply facilities. The case of New York City has become famous.

Careful reviews of the New York City water supply situation disclose without question that the shortage of water was due entirely to the delay in providing the physical facilities essential for delivering increased quantities, and not to the unavailability of water. This delay was man-made and was the result of a major economic depression, a serious world war and local municipal fiscal stresses. None of these causes were even remotely related to the absence of abundant water resources. These resources are abundant in the New York area and are economically available for uses far in excess of those now anticipated for the long distant future.[9]

WATER USES

How much water is used east of the Mississippi for various purposes? Uses are usually classified as municipal, industrial, rural domestic and stock use, irrigational, and water power. These may be called *withdrawal uses,*[10] requiring the water to be removed from the ground, stream, lake, or pond, as distinguished from *nonwithdrawal uses* for waste disposal, navigation, recreation, and the support of fish and wildlife. Most of the second group, unlike the first, do not lend themselves to evaluation in terms of quantity; but they are clearly of great economic and social importance.

It should be noted that when used, water is often only partly consumed, if at all, though its quality may be impaired. Obviously, the same water may be used again and again to generate power in a series of plants. In irrigation, from 20 to 60 per cent may seep into a stream as return flow.[11] A recent survey of water use in about three thousand manufacturing plants revealed that about 65 per cent of the plants discharged from 90 to 100 per cent of their intake.[12] A great part of the public water supply used in communities returns to the streams as sewage effluent.[13]

---

[7] Harold E. Thomas, *The Conservation of Ground Water* (New York: McGraw-Hill Book Co., 1951), pp. 20–21

[8] Where demand is concentrated and great, local sources within the watershed are often not sufficient New York reaches out 120 miles for water; Los Angeles, 350 miles.

[9] Abel Wolman, "Industry and Water Conservation," Paper presented before the American Association of Science, Philadelphia, 1951, p. 8. See also *Future Water Sources of the City of New York.* Report of Engineering Panel on Water Supply, 1951, 81 pp.

[10] Kenneth M. MacKichan, "Estimated Use of Water in the U.S.—1950," U. S. Geological Survey Circular 115, 13 pp.

Table 1 shows rough estimates of the quantities of water withdrawn for various uses in the twenty-six states east of the Mississippi (including District of Columbia), and, for comparison, the national totals for these uses.

TABLE 1—ESTIMATED WITHDRAWAL USE OF WATER, 1950[a]

Uses	States East of Mississippi			United States		
	Ground Water	Surface Water	Total	Ground Water	Surface Water	Total
Municipal	1,817	7,580	9,397	3,549	10,048	13,597
Industrial	3,590	65,295[b]	68,885	5,495	71,682[b]	77,177[c]
Rural (domestic and stock)	1,431	347	1,778	2,803	696	3,499
Irrigational	252	286	538[d]	19,654	67,776	87,430
Water power		858,140	858,140		1,246,660	1,246,660

[a] MacKichan, *op. cit.* note 10, pp. 6–7. All figures in million gallons per day (mgd) except those for irrigational use, which are in 1,000 acre-feet per year. An acre-foot is the quantity of water required to cover an acre one foot deep; 1,000 acre-feet per year equals 0.89 million gallons per day.

[b] 11,720 mgd was brackish (from tidal streams).

[c] This does not include water for industrial use from public supply systems, which is included under municipal.

[d] This does not include irrigational use described as negligible in sixteen states.

These data reveal that, apart from water power, the largest use of water in the East is industrial. West of the Mississippi the largest use is for irrigation. On a national basis these two uses are roughly equal in total (70–80 billion gallons per day), and far exceed the total United States municipal use. Municipal systems served about 93.5 million people in 1950, an average of 145 gallons per day per person.[14] For the entire country, far more surface water is used than ground water; the proportion is about 5 to 1. But about three times as much ground water is used west of the Mississippi as in the East, and chiefly for irrigation.

These are rough estimates, indicating gross withdrawals at sources with some water unavoidably counted perhaps several times; net consumptive use is much less.[15] The estimate of gross industrial use made by the United States Geological Survey includes water for cooling purposes; other estimates, made by industry itself and others, are far lower (10–25 billion gallons per day), depending on the basis of calculation.[16] It is clear in any case that the water needs of industry in general are considerable. The economic significance of industries which are large water users is indicated by the fact that they account for almost one-third of the total "dollar value added by manufacture" by all industries.[17]

---

[11] *Ibid.*, p. 3.

[12] *Water in Industry* (New York: National Association of Manufacturers and The Conservation Foundation, Dec. 1950), p. 41.

[13] MacKichan, *op. cit.* note 10, p. 3.

[14] MacKichan, *op. cit.* note 10, p. 4.

[15] See Report of the President's Water Resources Policy Commission, *A Water Policy for the American People*, Vol. I, 1950, p. 177.

[16] See Abel Wolman, *op. cit.* note 9, pp. 1–2.

In recent years federal and state agencies and industries themselves have been gathering more detailed information on industrial water use. A study made in 1950 by the National Association of Manufacturers and the Conservation Foundation developed data on some three thousand industrial plants, widely diversified as to location and type of industry. It was found that there was an average increase of 30–40 per cent in water intake, for the plants and industries covered, over the decade 1939–49.[18] The most spectacular increases in water use due to industrial expansion have been occurring in Texas. Yet in the East, Baltimore increased its water use almost 70 per cent from 1938 to 1948, while population grew only about 6 per cent; in Detroit use increased 47 per cent from 1932 to 1945, while population increased about 4.3 per cent.[19]

The range in the quantities of water used by industrial plants is rather striking. For the three thousand plants surveyed, between 5 and 6 per cent of them accounted for almost 80 per cent of the total water intake reported, while about 65 per cent took in less than 2 per cent of the total. This suggests that in many respects the problem of industrial water supply is that of the larger user. This must have considerable significance in planning the use of water resources. However, where water economy is necessary, the opportunities for conservation measures within the large water-using plants may be great. Thus, the Kaiser Steel plant in Fontana, California, uses far less water per ton of steel than the average for the industry.[20] Among large water users, the greatest part of the water intake is usually for cooling purposes; for plants in general, water is used for process purposes, cooling, sanitation, and service.

LACK OF FACILITIES

If the water resources of the East are generally ample, though varying considerably from place to place, why are supplies often insufficient in local areas to meet industrial needs? In the opinion of one authority,[21] the difficulties arise partly because of delay by communities in executing water development projects; the lag between planning and construction often amounts to ten to fifteen years. This delay reflects the fact that "municipal bodies move slowly, not only because bond issues always must carry conviction to the electorate, but because legal and fiscal restraints are many and time consuming for compliance."

The difficulties also arise because of outgrown distribution facilities. Installing and expanding such facilities require large amounts of money, "yet their significance in relation to industrial demand is most difficult to make clear to the average citizen and sometimes to the average industrialist."

---

[17] Engineers Joint Council, *A Statement of Desirable Policy with Respect to the Conservation, Development and Use of the National Water Resources,* 1950, Statement of Task Committee No. I, pp. 6–7. The data given are for 1947 The industries cited are. chemicals, textiles, steel, petroleum refining, rubber, pulp, paper and board, meat packing, canning, preserving and freezing, brewing, dairy products, whiskey, soap and glycerin, rayon, tanning, and manufactured ice.

[18] *Water in Industry, op. cit.* note 12, p. 11.

[19] Engineers Joint Council, *op cit.* note 17, p. 10 These data on Baltimore and Detroit refer to water from municipal supply only.

[20] This plant uses less than 1,300 gallons per ton of steel; the average figure usually cited is 65,000 gallons. Consumptive use by the plant approximates the amount that would be used if the site were devoted to agriculture. See *Water for Industry, A Review of Water Resources Affecting Industrial Location* (Washington: Urban Land Institute, Tech. Bull. 17, 1951), p 20.

[21] Abel Wolman, *op. cit.* note 9 See p. 10 for the two following quotations.

Related to this is a general lack of administrative and fiscal organization on the part of existing political units for developing water for industry. (Where industry is large it often undertakes its own water development on a strictly private basis.) What could be done in this direction is illustrated by "water district" agencies, such as the Washington Suburban Sanitary District and the Boston Metropolitan District, which have power to issue bonds and to construct and to operate water systems. The Charleston Development Board (South Carolina), for example, has been successful in attracting industries recently by taking the initiative in developing a large water supply (up to 10 billion gallons a day) at tidewater.[22]

POLLUTION TREATMENT

Severe and widespread pollution of surface waters in the East by physical, chemical, and biological wastes also limits the amount of water available to industry. The Delaware River, for example, each day receives about 500 million gallons of domestic sewage and hundreds of millions more of industrial wastes.[23] According to information gathered by the United States Public Health Service, about 24 million people of the 90 million living east of the Mississippi (excluding the population of the eastern part of the Upper and Lower Mississippi drainage basins) live in municipalities lacking sewage treatment of any kind.[24] Put another way, about 3,800 of a total 6,800 muncipalities in the East lack treatment facilities. In the same area there are about 6,400 industrial sources of pollution discharging wastes directly into watercourses. Of these, 1,760 treat their wastes, 2,859 do not, and 1,817 have undetermined facilities.

One measure of the seriousness of the problem is a Public Health Service estimate that for this area about 2,900 new plants are required for treatment of municipal wastes (with 1,300 cases as yet undetermined). Similarly, about 2,400 new plants are needed to take care of industrial pollution sources (with 2,480 cases undetermined).

A brief look at the record of the last fifty years gives some perspective to the pollution problem confronting the country. In the last half-century the total population of the United States, now 150 million, has doubled. In 1900 the *urban* population was about 30 million; in 1950 it was about 90 million; it has doubled in the last 35 years, and is now increasing at a rate of about 1,500,000 a year. Not only have new waste-treatment facilities been needed for this growth; the degree of treatment also must be greater to deal with a greater density of population. About 60 million people (1950) in the United States are tributary to some 6,700 sewage treatment plants; that is, about two-thirds of the urban population has some form of waste treatment, though only about 40 million may be said to receive complete treatment. The rate of growth of sewage treatment facilities over the last fifty years is shown in Table 2.[25] It seems fair to assume

---

[22] *Business Week*, Oct 20, 1951, pp. 90–91, 94, 96, 98, 100

[23] Rolf Eliassen, "Stream Pollution," *Scientific American*, Vol. 186, No. 3 (March 1952), p. 17.

[24] *Water Pollution in the U.S.*, U S. Public Health Service Publication 64, 1951, pp 30–33

[25] L. R. Howson, "National Water Re-

TABLE 2—GROWTH OF SEWAGE TREATMENT

Decade	Additional Population Having Sewage Treatment
1900–1910	3,000,000
1910–1920	5,500,000
1920–1930	8,500,000
1930–1940	19,000,000
1940–1950	23,000,000

that, should this accelerating rate continue, most of the sewage from urban sources would be treated by, say, 1970. It certainly seems reasonable to say also that the country could afford it.

> By and large practically any community in the U.S. that wants sewage treatment can finance it at a cost of approximately 1 cent per capita per day which will produce a sum sufficient to provide for the interest and amortization of the cost and the expense of operating the treatment plant. If waste treatment cannot be sold at so low a cost people have not been sufficiently educated as to the requirements or the cost.[26]

Estimates have been made of the total cost of reducing stream pollution in the United States to a reasonable level. Allowing for normal population increase, plant obsolescence, and so forth over the next decade, the cost for municipalities would be about 4.5 billion dollars (1950 prices). Since the industrial pollution load is somewhat larger than the municipal (while treatment methods, with known exceptions, follow the same pattern), the cost of abating it would be greater. Costs will be related also to the quality standards set for a particular stream. With a greater degree of waste treatment the stream will be suitable for more uses, but cost of treatment will be higher. Depending on the water uses finally chosen, the total cost for a pollution abatement program for the United States will range roughly from 9 to 12 billion dollars.[27] A more recent estimate (early 1952) is 20 billion dollars.[28]

MEASURES TO COMBAT POLLUTION

If the pollution situation is serious in many areas of the East, it is also true that much is under way to relieve it. A public more and more hemmed in by industrial and residential development is pressing its demand for clean water for recreation. Industry is becoming more sensitive to being called a bad neighbor, and it also has its own stake in water of good quality. The United States Supreme Court in a decision concerning the Delaware River stated some years ago: "A river is a treasure which offers a necessity of life that must be rationed among those who have the power of it."[29] Over the last decade this sentiment has been embodied in legislation by many states to control water use and waste disposal.

As of June 1951 only one state in the East had no law or program regulating stream pollution, though it had a study in progress to draft legislation. Of the 26 states east of the Mississippi, 8 require primary treatment of all wastes; 6 have laws covering a specific industry; 23 control established sources of pollution; 24 provide penalties; 16 have provision for classification of streams; 14 classify or are now in process of classifying streams; 26 require approval of new treatment plants; 13 help or advise in design of plant.[30]

---

sources Policy as Related to Stream Pollution," *Sewage and Industrial Wastes*, Vol. 24, No. 2 (Feb. 1952), pp. 222–27.

[26] *Ibid.*, pp. 226–27.

[27] U. S. Public Health Service estimate. *Op. cit.* note 24, p. 37. Probably 1950 prices.

[28] Rolf Eliassen, *op. cit.* note 23, p. 20.

[29] Quoted by R. F. Weston in "An Industrial Approach to Water Pollution Abatement," at the 1951 meeting of the American Association for the Advancement of Science, p. 2.

[30] "Industrial Waste Treatment," *Industry and Power*, June 1951. See also M. D. Weiss, *Industrial Water Pollution, A Survey of Legis-*

With the passage of the Water Pollution Control Act in 1948 the Federal Government has taken a leading role in working toward uniform and effective legislation by the states, while recognizing their primary rights and responsibilities in this field. Financial aid is also given. For the period 1948–52, the sum of 22.5 million dollars annually was appropriated for loans to states, municipalities, or interstate agencies for sewage works construction. A million dollars is given the states annually for research and surveys; another million is granted for preliminary investigation of specific approved projects. Research in waste utilization is also promoted. The United States Public Health Service, co-operating with the states, is surveying pollution conditions throughout the country, river basin by river basin.[81]

Interstate agencies

The work of interstate agencies concerned with water pollution in the East also ought to be noted. There are commissions or informal agreements covering the Delaware Basin ("Incodel"), the Potomac Basin, the New York Harbor and adjacent tidal waters and estuaries, the interstate waters of New England, the Ohio River Valley, the Great Lakes Drainage, and the Upper Mississippi Drainage.

The Ohio River Valley Water Sanitation Commission formed in 1948, for example, is actively pressing a pollution abatement campaign among the communities and industries of the valley in the belief that "persuasion with facts rather than compulsion by law [is] a speedier way to gain its objectives."[82] It has the active co-operation of five industry groups studying methods of dealing with specific wastes; the commission also makes technical studies as a basis for policy decisions. The commission has legal powers as yet unused for securing compliance with its orders. The chairman of the commission recently stated:

> I consider it the responsibility of a control agency to make the necessary surveys to define the industrial problem in terms of volume, strength of wastes, their effect on the outlet stream, and the degree of treatment required. However, the solution of an industrial waste problem is the responsibility of the industry, and the fact that no practical solution to a particular waste problem has yet been effected merely indicates that insufficient time and study have been given to it by that industry. The cost of industrial waste treatment, I feel, is rightfully charged to production costs.

INDUSTRIAL RESPONSIBILITY

The conviction is spreading that

> the only reasonable and equitable public policy is that each industrial establishment must be responsible for the proper control of its wastes. Therefore, the costs of waste control facilities automatically becomes a part of plant installation costs and the costs of waste control operations becomes an integral part of the operating costs of the plant. Waste control becomes a utility requirement the same as water, steam, power and drainage. It becomes one additional cost to operation that must be borne to assure the opportunity and privilege of operating in an advantageous industrial economy.[83]

Of course the cost of equipment for the treatment of waste represents a capital investment which, along with the cost of operating such equipment, becomes a part of the cost of producing

---

lation and Regulations, New York: Chemonomics, 1951.

[81] Reports have already been published for eleven drainage basins over the country U S. Public Health Service, *Summary Reports on Water Pollution,* Water Pollution Series, Nos. 2–7, 9–12, Washington, 1951.

[82] *Third Annual Report,* 1951, The Ohio River Valley Water Sanitation Commission, Cincinnati, 36 pp.

[83] R. F. Weston, *op. cit.* note 29, p 6.

goods and is therefore reflected in the selling price.[34]

The losses caused by water pollution cannot be computed easily; many are intangible. But it may be said that they represent social costs [35] which are gradually being recognized. Most of those discussing the subject agree that educating the public regarding the nature and extent of the problem, and their responsibilities in it, will hasten this more realistic "cost accounting."

RESEARCH NEEDED

There is broad agreement, too, about what generally would help to improve the water situation in the East. There is great need to proceed as rapidly as possible with comprehensive investigations of water sources, especially in the field of ground water. Only with greater knowledge than we have now regarding most areas will further development be soundly based. The relation of the use of land to the availability of water is also still imperfectly understood. Technical governmental agencies, such as the United States Geological Survey, the United States Forest Service, and comparable state organizations, play a leading role in this indispensable research activity; it should be expanded.

As important as knowing how much is naturally available from area to area is knowing the effects of water uses with respect to quality as well as quantity. Much remains to be done along this line; a great deal of water is or could be reused in certain areas. Reclamation of sewage effluent and reuse of water within industrial plants are increasing but could be employed more than at present.

Stephen Bergen, New York City, is a researcher with the Conservation Foundation.

---

[34] W. J. Eldridge, *Making a Waste Survey for a Large Industry* (Proceedings Fourth Industrial Waste Conference, Purdue University, 1948), p. 7.

[35] K. W. Kapp, *The Social Costs of Private Enterprise* (Cambridge, Mass.: Harvard University Press, 1950), pp 1–25, 80–93.

Soil Conservation and Floods

By Hugh H. Bennett

THE 1951 flood catastrophe in Kansas and neighboring states once more has focused attention on the urgent need for more effectively curbing the floods that somewhere every year sweep destructively across productive farmlands and through prosperous towns and cities.

What can be done to prevent the staggering losses in crops, soil, property, even human life, will depend to a very considerable degree on the wisdom and timely efforts of the people and their leaders.

In any clear presentation of the problem several points should be emphasized at the outset:

1. We can be certain that costly floods will strike again next year, or the next, somewhere in the country.

2. Our experience shows that it is possible to control or greatly reduce floods. It shows that the smaller, more localized floods along the upper tributaries or "little waters" can be eliminated almost completely; and indicate that substantial reduction of flood flows along the major streams is also practicable.

3. Soil erosion is part of the flood problem—the result of the rains that produce floods and the source of the silt that reduces the carrying capacity of streams and the water-retention capacity of reservoirs.

4. Soil conservation is an indispensable and co-ordinate part of flood control and silt control.

No single method of flood control can do an adequate job. We have seen in the recent Midwestern flood, for example, that levees high enough to withstand the largest previous floods on record were overtopped. We have also seen that the soils of fields and pastures became so nearly saturated after weeks of heavy rains that they could absorb but little more from the final big rains. To meet all kinds of flood conditions and prevent or minimize flood damages wherever they are a hazard, we must use every available method of control we know about.

Every additional gallon of water that can be stored in the soil through the use of conservation measures means one gallon less contributed to flood flows.

A first step, then, in flood prevention is to put the soil in optimum condition for maximum water intake. This will require the maintenance of good soil structure, a good cover of vegetation wherever practicable, and efficient engineering structures wherever required. What excess water runs off fields into drainageways must be slowed down with small retarding structures along the headwater drainages, and what flows out of these lesser drainages will have to be handled in the main river valleys by more imposing measures—large engineering installations, such as reservoirs, levees, floodways.

The job of flood control, then, begins where the rains fall and does not end until the runoff reaches the ocean.

CO-ORDINATION OF FLOOD CONTROL EFFORTS

It is important to determine what kind and combinations of measures are needed, where to use them, and how best to dovetail their use, watershed by watershed, in order to accomplish the best possible job of flood control. In doing this we must, of course, bear in mind the continuing need for water storage for irrigation, power, municipal water supply, pollution abatement, and preservation of fish and wildlife, and maintenance of maximum ground and underground storage. It must be borne in mind that the use of the limited number of suitable sites for large reservoirs should be considered in relation to the multiple needs for land and water before they are dedicated solely to flood control.

Distribution of flood damage

Another feature necessitating co-ordinated effort is the distribution of flood damages. The crops of upland fields that are washed out or covered with eroded soil resulting from flood-producing rains are just as truly lost as the crops on overflowed land in the valleys below. Soil washed out of upland fields reduces the productivity of that land just as much as, or more than, deposition of soil carried by waters flooding agricultural bottomlands along the rivers. Floodwater damages to agricultural lands in the hundreds of thousands of miles of small, upstream creek bottoms represent just as much loss per acre as the flooding of the wide Missouri River bottoms between Kansas City and St. Louis.

The Soil Conservation Service, in its preliminary survey of the storm and flood damages in Kansas and Nebraska during July 1951, found that losses of crops on upland farms amounted to approximately $110 million. Losses of rich topsoil were estimated at $200 million. Losses from floodwater and sediment in the small creek bottoms above the points where anyone has yet proposed specific flood protection measures were estimated at $102 million. The total of these estimated damages amounted to $412 million. Probably at least 90 per cent of these losses could be prevented through the soil and water conservation and flood control programs being carried on by the Department of Agriculture. And the benefits would largely exceed the cost.

Without in any way minimizing the staggering downstream losses, like those at Kansas City last year, the even greater damages along the tributary streams are convincing evidence that a flood control program aimed only at protection of downstream cities and river bottoms is only partially effective and will certainly not benefit all the people who suffer flood losses.

Superfloods like this last Midwestern flood are comparatively rare events. I understand that the flood discharge at Kansas City last year far exceeded the highest ever previously experienced. Such an occurrence not only makes banner headlines, but it becomes a historic event to be retold down through the decades. It stays in our memories and gets into textbooks. People come to look on such a catastrophe as characteristic rather than something rare—or unique. Actually, if the enormous damage caused by such a superflood is spread over all the years between such rare events, the average annual loss is considerably less that that from all the smaller local floods that occur year after year in the smaller watersheds.

Surveys thus far made indicate that around three-fourths of our average annual flood loss has occurred above the main river valleys and large cities. This, of course, is partially due to the fact that some of the major river floodplains and many cities have already been protected by levees, floodways, and combinations of reservoirs—for which credit is due to the effective work of the Army's Corps of Engineers.

Erosion

There are still other reasons why a co-ordinated approach to flood control is essential. As already pointed out, erosion must be controlled upstream in order to protect flood control reservoirs downstream from rapid silting and consequent loss of effectiveness. And to re-emphasize, erosion must be controlled to prevent the silting of stream channels, which further reduces their flood-containing capacity, and to prevent overwash of infertile sand and poor subsoil material on productive bottom lands. But even more important than these, erosion must be controlled if we are to maintain the base for agriculture, on which depends national strength and defense and, conceivably, the prevention of civilization from going the disastrous way of many great nations of the past which failed to take care of their agricultural land.

One of the most important responsibilities shared by all the people of any state, county, community, or neighborhood is to safeguard and prudently use the land and the water that makes land productive. Such conservation, to be fully effective, must be applied to every acre of land needing it, and this according to the kind of land a farmer has and its need for protection and improvement. This basic concept of effective soil and water conservation is taken from nature's handbook for creating soil in the first place and then safeguarding it for perpetual productiveness.

SOIL CONSERVATION IS PART OF FLOOD PREVENTION

The flood problem was not tied in with the erosion problem in any effectively working relationship until the advent of modern soil conservation.

Look at some of the measured effects of land use on erosion and runoff: At the Northwest Appalachian Conservation Experiment Station near Zanesville, Ohio, the losses from bare ground (hard fallow) on a 12 per cent slope amounted to an annual average, over nine years, of 96.58 tons of soil per acre and 44.8 per cent of the rainfall, including snow. But from bluegrass the soil loss was only 0.028 ton per acre and the water loss 5.42 per cent of the rainfall. The corresponding losses from continuous corn on the same kind of land having the same slope were 99.3 tons of soil per acre and 40.32 per cent of the rainfall.

Comparative soil and water losses from small watersheds over a nine-year period recorded on this experiment station included only .01 ton of soil per acre and 3.2 per cent of the precipitation for woodland, and 17.18 tons of soil and 20.6 per cent of the precipitation for a cultivated watershed. During January 1937, when a huge flood swept down the Ohio River, the rainfall on these watersheds totaled 10.48 inches. The wooded watershed lost as runoff 36 per cent of the precipitation; a pasture watershed lost 75 per cent; and the cultivated watershed lost 95 per cent.

Such precise measurements made in great numbers throughout the country cannot be discarded as representing what happens on just mere bits of land, for the reason that the country is a mosaic of bits of land differing from one another in many ways. To be sure, the runoff will be much more per acre from some areas, but it will also be much less from others. Quantitative measurements have been made on so many different kinds and patterns of land that I believe these measurements represent a fair average of what happens to the rainfall of countless watersheds throughout the country. There will be wide differences, of course, but significant meaning undoubtedly can be found in the results as estimated by those acquainted with local details of climate, land, agriculture, and the land's retentiveness of rainfall. Such experienced specialists will be able to weigh with considerable accuracy the effects of rainstorms on local flood flows.

The technicians of the Soil Conservation Service carefully weigh all these physical facts in all their work having to do with the control of floods and soil erosion. The Service has been the leader in technical investigations relating to the character of the land, the pattern of rainstorms,[1] the amount of water contained in mountain snows (as shown by snow surveys), the effect of soil and soil condition on water-absorption capacity, and similar matters. Moreover, the Soil Conservation Service has made, and continues to make, a great many detailed studies of the effects of cover, cultivation, land use, and soil conservation on runoff and erosion from both large and small watersheds in many parts of the country.

One of the first watershed erosion control undertakings ever completed in this country was that at Honey Creek in Bucks County, Pennsylvania. Prior to conservation work on the upper slopes of the watershed, the land in the lower part of the little valley was too wet for cultivation because of excessive overflow, and had little value except for poor pasture. But I saw that land producing good crops as a result of conservation measures applied to the entire valley. Not only the erosion problem but also the flood problem was largely overcome.

AN EXAMPLE OF FLOOD CONTROL CO-OPERATION AT THE GRASS ROOTS

The work in the Salt-Wahoo watershed, near Lincoln, Nebraska, is a good illustration of the co-ordinated watershed approach to flood control. Here also is a striking illustration of effective community co-operation, including the Salt-Wahoo Watershed Association, which is made up of city people and farmers in Soil Conservation Districts, with representatives of the Soil Conservation Service, the Army Engineers, and other local, state, and federal agencies.

Joint studies of this watershed are being made by the Soil Conservation Service and the Army Engineers under authority of the Flood Control Act of 1936. It is hoped that this study will lead to authorization of a co-ordinated program for flood control in this area similar to that already authorized in eleven other watersheds of the country. I think the soundness of this co-operative approach was well stated in the progress report on the joint watershed survey made by the Army Engineers and Soil Conservation Service. The report pointed out that the two agencies had one objective in this study—that is, to prepare an over-all plan for the entire watershed which, quoting from the report, "will represent from the standpoint of both agencies the best plan for the basin as a whole which is practicable within the limits of economic feasibility, and one which both agencies can recommend and support without reservation."

"Both agencies feel," the report added, "that this objective can best be realized by a joint study which will produce a single plan mutually developed by both agencies rather than a compromise between two individual plans developed by the two agencies acting independently."

The Salt-Wahoo undertaking also illustrates the importance and effectiveness of local group action in watershed planning and development. Here, as elsewhere, the local soil conservation districts are taking an important part in the permanent watershed program. As the principal organization through which soil and water conservation measures are being applied to the land by individual farmers the country over, it is only logical that these districts also should be called on to serve directly in such flood control activities in the public interest.

---

[1] See Hugh H. Bennett, *Soil Conservation*, pp. 179–97.

By the same token, the Salt-Wahoo situation shows why there is a place for an advisory group like the Salt-Wahoo Watershed Association to bring together the interests of farmers and city people. For any watershed development program to operate successfully, the basic responsibility for that program must involve the people residing in the watershed. That means there should be a local responsible organization which is representative of all the interests in the watershed and which can act promptly to co-ordinate the activities and services of all agencies and interests to formulate the necessary broad, flexible program for watershed development and protection.

TECHNICAL SKILL AND DETAILED TREATMENT NEEDED

It should not be overlooked that planning and application of watershed programs require special technical skills. Downstream, the highest order of engineering skill is necessary for building dams, main-channel stabilization works, and so on. Likewise, in the uplands technical know-how is required to plan and install sound land-use and land-protection treatment and upstream engineering measures. Such work must be based on painstaking research and practical experience. It must take into account the principles of hydrology, engineering, agronomy, land and conservation science, forestry, biology, and other related fields.

In no event can the watershed planning and treatment be accomplished overnight with some magic formula, although it takes heavy rains and excessive runoff only a few days, or even hours, to do irreparable damage to land and property.

We cannot depend on windshield surveys and office planning to carry out a job of the complexity and magnitude of safeguarding our farmlands and controlling floods. Nor can we have a ready-made plan including a fixed set of practices to slap on any farm or watershed. Land and the behavior of water falling on land differ from watershed to watershed, from farm to farm, sometimes from field to field. Accordingly, every watershed and each parcel of land in every watershed must be dealt with individually. And, moreover, every distinctive parcel of land within every watershed must be dealt with according to its complementary relationship to every other parcel of land—wherever there is any significant relationship.

That, briefly, is how, in this era of soil and water conservation, we are going about the treatment of agricultural land for effective soil conservation and flood prevention and control. We have developed a unique combination of soil-conservation, engineering, and vegetative practices designed to dispose of surplus water safely while making the best practical use of the water that otherwise would also be wasted. Thus, for the first time in history, we are going into the small watersheds to do everything possible to provide relief from recurring flood damages. Splendid examples of the effectiveness of tributary stream flood control can be cited from the experiences of the Soil Conservation Service and the soil conservation districts.

TAKING THE TEETH OUT OF FLOODS

Not long ago, while looking over the flood control work being carried on under the Little Sioux River Watershed Authorization, in Iowa, I came to the definite understanding that finally we are doing the upstream phase of the flood control job properly. I had understood all along that we were not likely to have fully effective, nationwide flood control until both the upstream and downstream phases of the job were carried out properly and in co-ordination.

Here on the Little Sioux the Soil Conservation Service is co-operating with the local Soil Conservation Districts in carrying out the upstream part of the flood control job on this typical floodstream. The job is being done, subwatershed by subwatershed, beginning at the upper end of these tributary streams and working on down along each to the main chanel. The general procedure is exactly the same in principle as that being followed in other watersheds of the country where the Department of Agriculture is going extensively into flood control work on watersheds authorized by Congress.

The flood control part of the Department's contribution, over and above the normal soil conservation work on farms and ranches, covers such items as the construction of water-detention reservoirs, gully plugs, diversions, and roadside work. Farmers ordinarily cannot carry out such operations because of their size and technical requirements. Moreover, they should not be expected to do so, because these works have a public benefit, affecting many people downstream from the points of installation—even more so, frequently, than the farmer on whose land the work is done. But farmers are helping, county highway authorities are helping, Soil Conservation Districts are assuming responsibility for general maintenance operations and farmer co-operation, and, in the instance of the Little Sioux, a committee composed of representatives from the various Soil Conservation Districts covering portions of the watershed is furnishing very helpful assistance in setting up priority work jobs, assignment and routing of machinery, developing arrangements for farmer and soil conservation district co-operation and assistance in connection with the cost and execution of maintenance operations, and so on.

Such a highly co-operative arrangement with the farmers is perhaps the backbone of the matter of getting the flood control job done expeditiously and effectively, and of maintaining the installations.

The effective performance of conservation measures under flood conditions may be observed on watersheds in various parts of the country where flood control work has been done. You may see it, for example, on the Theobold Creek subwatershed of the Little Sioux River in Iowa. There, three detention reservoirs and ten small structures on the main creek channel have reduced the fall and velocity enough to eliminate much of the formerly serious channel cutting. There are also six structures in lateral drainage, and other conservation measures, along with proper land use. The effect of these developments has been to eliminate virtually the entire erosion and flood problems in the subwatershed.

Dollar benefits

Dollar benefits accruing from such effective measures are likewise beginning to pile up over the country. For example, improvements completed in 1950 in the small Masters subwatershed of the Little Sioux prevented measurable damages of $3,600 in one rainstorm in June 1951, plus possible livestock, traffic, siltation, and other damages not evaluated.

A survey of damages from the January 1952 flood in the San Fernando Valley of the Los Angeles River watershed in California showed the effectiveness of the far from complete conservation flood control work. Damage was negligible in the areas protected by this work. Conservation-treated cropland suffered little erosion; whereas up to 100 tons of soil per acre were washed off some of the adjacent, unprotected cropland. And while a total of some $730,000 damage was done on the unprotected subwatersheds, flood control works prevented $300,000 of damage to land and property in the treated subwatersheds.

The Washita River watershed in Oklahoma is another of the eleven authorized flood control projects. Its Sandstone Creek subwatershed has suffered annual flood damage of about $60,000. The nearly completed program on this creek includes land treatment measures and floodwater retarding structures. It is estimated that future flooding will not exceed an average of 110 acres annually, out of the total floodplain of 4,700 acres, with an estimated annual damage of only $1,236. That is an estimated 90 per cent reduction in annual flood damages, or $57,461 a year. At the same time, the estimated annual net benefit from more intensive land use by farmers will be more than $11,000. All together, the measures installed on Sandstone Creek will produce approximately three dollars of benefit for each dollar of cost.

When the structural and land treatment measures have been completed on the entire Washita watershed—now one-third planned—at a cost of about $74,000,000, the total floodwater and sediment damages will be reduced by an estimated 73 per cent, or more than $4,000,000 annually. Confirmation of these anticipated benefits may be found, for example, on the approximately 6,000-acre Cloud Creek subwatershed, where the watershed treatment work was completed in 1948 at a total cost of $97,366. Annual operation and maintenance costs have amounted to about $2,900, including interest on installation costs; whereas total annual benefits have averaged about $5,700. So, for each dollar of cost this work is returning $1.96 in benefits.

Conservation and flood control benefits on an 18,432-acre subwatershed of the Little Tallahatchie River in Mississippi for the year ending June 30, 1951 were calculated at $25,000. The year's apportioned cost of the watershed improvement work responsible for that calculated return was only $13,334, or a little less than 2 to 1 benefit ratio. The annual cost was arrived at by including 2½ per cent of the federal and 4 per cent of private cost of installation, plus operation and maintenance costs for the year.

Similar benefits and dollar returns are mounting throughout the country, as in the Trinity River watershed in Texas, to cite one more. There, benefits of $2.20 for each dollar of cost are being returned on the 15,570-acre Howard Creek subwatershed, although the treatment has been only partially completed. On Honey Creek, the subwatershed program is estimated to bring benefits of $7.12 for each dollar of cost; and the East Fork program, above Lavon Reservoir, $10.12 in benefits for one dollar of cost.

In the big river basins

On the basis of such measured benefits, surveys, and other sound information available, we may estimate with reasonable accuracy the far wider resource conservation and economic returns that will come from the extension of co-ordinated watershed flood control programs to the nation's big river basins like the Missouri Basin. The whole program of the Department of Agriculture in the Missouri Basin would cost, as estimated, a total of about $8.5 billion, including cost to farmers, the Federal Government, and state and local interests.

At the same time, the program would protect an extensive but undetermined acreage, prevent annual flood and sediment damages of an estimated $25.25 million, provide three-quarters of a billion dollars in associated benefits annually, and return other, unevaluated benefits to the nation's agricultural plant, to our local and national economy, and to national security and defense. Figuring the total annual cost at something over $500 million—including interest on the investment and operating and maintenance costs—the net benefits would be expected to be about $250 million annually, or a net return of about 3 per cent on the original investment.

Although it is not claimed that such watershed programs will by themselves control superfloods like the 1951 Kansas-Missouri flood, they can be counted on to curb the flood flow in some degree. The real problem is where the people of a major river basin and of the nation as a whole may want to draw a line of compromise between the fullest utilization of protected tributary valley lands and the fullest protection of downstream urban areas and mainstem floodplains.

Soil conservationists do not hold that they can "dry up the rivers" by spending the amount of money on watershed programs that is spent on flood control reservoirs. Additional controls such as reservoirs, levees, and other main-channel protective works will always be needed for complete safeguarding of the floodplains against disastrous major floods.

PRINCIPLES OF EFFECTIVE TREATMENT

The basic principles of effective watershed or river basin treatment are clear: conservation land treatment for soil erosion prevention and orderly disposal of runoff water, upstream engineering for waterflow retardation and channel stabilization, and downstream engineering for control along the mainstems.

There we have, as soil conservationists understand it, a co-ordinated approach to flood prevention and control—a program that protects the farmer of the uplands as well as of the lowlands, while protecting the cities, too.

Hugh H. Bennett, D.Sc., LL.D., Washington, D. C., is special assistant to the Secretary of Agriculture. He entered the employ of the Department of Agriculture as a soil scientist in the old Bureau of Soils in 1903. From 1933 to 1935 he was director of the Soil Erosion Service in the Department of the Interior. In March 1935, when that agency was transferred to the Department of Agriculture as the Soil Conservation Service, he was named chief of the new Service and served in that capacity until November 1951.

Labor Looks at Conservation and Development

By Anthony Wayne Smith

EARLY theories of industrial unionism prophesied that a broad interest in general social problems would appear within the labor movement as plant-wide organization replaced the traditional craft-union structure. The comprehensive programs of the Congress of Industrial Organizations bear considerable witness to the soundness of these expectations.[1] Some of them, for example, deal with the conservation of natural resources and related issues of regional development, matters which might be supposed at first glance to be distant enough from labor's preoccupations.[2]

The Re-employment Plan presented by Mr. Philip Murray, president of the CIO, to the CIO Convention in 1944, is an early landmark.[3] Anticipating the possibility of a severe industrial recession after the war, this statement called for expanded government investment in peacetime projects, and recommended, among other things, the application of the principles of the Tennessee Valley Authority in the other major watersheds of the country.

The TVA idea was endorsed, first of all, as a full-employment measure: construction; manufacture of turbines, generators; production of steel, copper, and the like. It symbolized industrialization, new plants, more jobs, reduced electric power rates, and higher living standards. The CIO understood quite well that the great upsurge of prosperity in the Tennessee Valley, after TVA, was attributable in large measure to the low-cost public generation and transmission of hydroelectric power. But the related aspects of TVA policy were not overlooked: flood control, navigation, soil conservation, fertilizers, reforestation, and, above all, the integrated valley-wide plan.

At the same convention, by separate resolution, on the initiative of the late Worth Lowry, then president of the International Woodworkers of America (the CIO union in the logging and sawmill industries), a comprehensive statement on forest conservation was adopted.[4]

With these declarations as a starting point, the interest and activities of the CIO have expanded until they now touch to some extent on almost all aspects of regional development and conservation.

PROPOSED MISSOURI VALLEY AUTHORITY

When President Roosevelt recommended a Missouri Valley Authority, modeled on TVA, and Senator James E. Murray of Montana introduced the legislation, the CIO endorsed it.[5] In association with the National Farmers Union, numerous Rural Electrification Administration co-operatives, public power groups, and a few organizations of the American Federation of Labor, it worked vigorously for the MVA bill for several years.

---

[1] *Proceedings, CIO Convention,* 1944, 1946–51; see the Annual Report of the President, and Resolutions on various aspects of conservation and development.

[2] *The Foundations of Prosperity,* CIO Committee on Regional Development and Conservation, CIO Publication No. 183, 1949, republished 1950.

[3] *Re-employment,* CIO Publication No 116, 1944.

[4] *Proceedings,* 1944, cited note 1 *supra,* p 172.

[5] See the full text of my statement to the Sub-Committee of the Senate Committee on Irrigation and Reclamation, mimeographed, 1945.

As is well known, at the time the MVA proposal was advanced, the Bureau of Reclamation and the Army Corps of Engineers had separate plans already prepared for the region; unfortunately, they were in fundamental conflict.[6] Nonetheless, when the MVA movement began to gain momentum, they were combined into the so-called Pick-Sloan program, which was offered as a substitute for an MVA, and congressional authorizations were obtained.

Appropriations proved slow in arriving; when they were sought, it was the residents of the valley themselves, and particularly the people who would be flooded out by the dams, that objected to construction.[7] The refusal of Congress to provide for comprehensive planning was accompanied by negative opposition to the Pick-Sloan proposals and a stalemate in the valley.

It could easily be foreseen, of course, that the first serious floods might result in an indiscriminate demand for action, of which the Pick-Sloan projects, others being unavailable, would be the beneficiaries; the Pick-Sloan forces could afford to bide their time. The disaster in the Kaw River Basin in the summer of 1951 provided the long-awaited opportunity, and the Corps of Engineers began blowing the bugles for its levees and big downstream dams.

It might have been understandable had labor joined in the uproar; the packing houses and assembly plants of downtown Kansas City which were wrecked by the flood had employed thousands of men who were members of CIO unions; the companies threatened not to rebuild, and the workers were faced with permanent loss of employment; in many cases their homes and possessions had been swept away.

At this juncture, however, Mr. Murray wrote publicly to President Truman and warned against the danger of falling back on Pick-Sloan. He recommended the appointment of a Presidential Commission to replan the basin, urged immediate attention to the watershed management program of the Department of Agriculture,[8] called again for an MVA, and went on to recommend a national Watershed Review Board, with authority over Engineers, Reclamation, and the Federal Power Commission.[9]

From the beginning, the CIO had pointed out that one of the great needs in the Missouri Valley was for substantial blocks of hydroelectric power to lighten labor on farms and bring industrialization; Pick-Sloan would not produce the power. Great waste would be involved in the flowing-channel navigation scheme and in the high-cost irrigation. Flood control should begin at the divide, and not with levees and main-stem dams. The unnecessary destruction of priceless farmland and waterfowl and game-animal habitat was inexcusable. The prospect was for the spread of man-made deserts along the margins of the enormous reservoirs during the dry cycle and for the appearance of artificial swamps and quicksands behind the huge concrete emplacements, as the silt-laden Missouri River, in the course of two or three generations, filled the reservoirs and rendered them useless. As usual, the Indian tribes were being expelled from their fertile river-bottom lands and driven into the hills, their traditional way of life destroyed; money damages, slow in arriving, could never compensate for the loss. Tens of thousands of other residents of the valley were also being uprooted. Much heavier emphasis needed to be placed on the programs of soil conservation, reforestation, and watershed management which had ostensibly (and to some extent actually) been part of the TVA approach.[10]

---

[6] They had many other serious faults. See *The Big Missouri,* Public Affairs Institute, 1948; also the Hoover Commission Task Force Report (Commission on Organization of the Executive Branch, Task Force Report on Natural Resources, 1949, p. 107, *et seq.*).

[7] For example, opposition of the Fort Berthold Indians to the Garrison Dam; of the Blue Valley farmers to the Tuttle Creek Dam; see *Flood Control . . . in reverse,* Blue River Study Association, Bigelow, Kansas, 1947.

[8] *Missouri River Basin Agricultural Program,* H. Doc. 373, 81st Cong., 1st sess, 1949.

[9] The establishment of such a board had been suggested by the Cooke Commission (Water Resources Policy Commission: *A Water Policy for the American People,* 1950, Vol 1, p. 49), though with some vagueness in respect to the power of the board over the licensing function of the Federal Power Commission; but the board would be impotent without authority over the Power Commission; private power development would race ahead without plan, while public development would be frustrated. The Hoover Commission had also recommended the establishment of a Board of Impartial Analysis of Engineering and Architectural Projects (Commission on Organization of the Executive Branch, Report on Department of Interior, 1949, p. 2).

The President, in reply to Mr. Murray, conceded the need for an MVA, but pointed to the problem of electing a favorable Congress; in January he announced the appointment of a Presidential Commission to restudy the basin.

PROPOSED COLUMBIA VALLEY AUTHORITY

Meanwhile, bureaucratic rivalry and conflict, contractor pressure, and local "boom" psychology had led to the presentation of another hybrid program to Congress (the Pick-Straus plan), covering the Columbia River Basin. In this case power development was not neglected, but there was the usual inattention to soil and forests, the customary callous invasion of Indian rights, a squandering of funds on fantastically expensive irrigation programs, a serious overemphasis on navigation, and a wanton disregard of the migratory fish runs as an essential resource of the Pacific Northwest. President Truman proposed a Columbia Valley Authority; the CIO endorsed the CVA legislation in the hope that better planning might result.[11] When the possibility of immediate passage faded, it opposed authorizations and appropriations for the more objectionable portions of the Pick-Straus plan (while urging the immediate construction of specific hydroelectric power projects), pending a genuine effort to solve the fisheries problem. The issue still hangs in the balance.

POWER DEVELOPMENT VERSUS OTHER VALUES

The controversy focuses attention on the need to reconcile the protection and conservation of living resources with the development of hydroelectric power. The CIO has always favored a generous development of power. Uniformly, the legislation it has endorsed (TVA, MVA, CVA, St. Lawrence project) has provided for public development and transmission, distribution with a priority to publicly and co-operatively owned agencies, and public aid to such agencies in acquiring existing systems.[12]

On the other hand, the CIO has urged that power development take place within the framework of complete valley-wide plans in which due attention is paid to soil, forests, wildlife, recreation, scenery, and minority rights.

---

[10] Frank, Bernard, and Anthony Netboy, *Water, Land, and People* (New York: Alfred A. Knopf, 1950), pp. 209 *et seq.* As to the above paragraph in general, see notes 5, 6, and 7, *supra.*

[11] *The Magnificent Columbia*, CIO Committee on Regional Development and Conservation, CIO Pamphlet No. 178, 1949.

[12] Bills dealing with the St. Lawrence Seaway and Power Project differ; testimony on behalf of the CIO, favoring the project, has always supported the policies indicated.

It has pointed out that the damage above the dam (including intangibles and long-range factors)[13] must be balanced against all benefits.

This is a difficult position to maintain. Programs which are bad from a conservation point of view (for instance, Pick-Straus) may have merit as power producers. To oppose them in the absence of ready alternatives may seem to jeopardize industrial expansion (a serious matter in wartime), or may lead to the issuance of certificates by the Federal Power Commission for private development.[14] Proponents of public power need all the support they can muster against the attacks of the electric utility industry, but unfortunately they have too often been heedless of the well-founded objections of conservationists in particular cases.

LABOR'S RIGHTS AND DISPERSION OF INDUSTRY

At all times, the CIO has insisted that an indispensable element of the TVA idea is fair treatment for labor, including payment of not less than prevailing wages and recognition of the right of employees to organize and bargain collectively and take concerted action for mutual aid and protection. Obviously, the acceptance of collective bargaining by public agencies engaged mainly in economic enterprise is a prerequisite to union support for such public operations.[15]

Another problem which the CIO has recognized in its development programs is the dispersion of industry. Clearly, power dams and transmission lines must be so located, within broad limits, as to supply existing load centers. But at the same time the choice of sites for dams and lines influences the location and density of industrial, hence residential, concentrations. The CIO has been insisting that our great cities have become impossibly congested, and that dispersion is essential for both peacetime and wartime purposes. Such dispersion cannot be accomplished without industrial decentralization; the latter can be helped or hindered by public policy in power development and transmission. Countless lives may depend upon dispersion in the age of the atomic bomb; peacetime health and happiness will depend upon it increasingly in the future. Since it is humanly desirable, it should be planned for, and the transition should be accomplished with guarantees of job security and union stability, and without undue hardship and dislocation; such an outcome is by no means impossible if we set our minds to it.

FORESTS, SOIL, AND RANGES

The forestry program of the CIO and the International Woodworkers of America has been a distinguished one, comprising some of the most comprehensive proposals since the days of Gifford Pinchot. It calls for direct regulation of timber harvesting on all private timberlands on principles of sustained yield, selective cutting, and individual tree marking;[16] for the development of a comprehensive system of access roads open to the public; for the protection and extension of the National Forest System;[17] for adequate appropriations and abundant federal credit for timber management;[18] for the extension of many of the agricultural aids to forestry; for experimentation in the public purchase of managerial rights in privately owned timber lands; and for a number of specific projects, such as a national forest with park units comprising the entire coast redwood belt in California.[19] While the employment interests of loggers and sawmill workers provide a solid foundation for this program, it is a real expression of the citizenship interests of the union membership.

---

[13] It opposed approval of the Report of the Subcommittee on Benefits and Costs of the Federal Inter-Agency River Basin Committee (1950) on the ground of inadequate attention to intangibles and long-range factors.

[14] The point about the Commission is widely overlooked; though not, of course, by the utilities; see note 9 *supra*.

[15] As to the efforts of federal agencies to solve this problem constructively, see *Labor-Management Relations in TVA*, S. Rept. 372, 81st Cong., 1st sess. (1949); *Labor-Management Relations in the Bonneville Power Administration*, S. Rept. 192, 82d Cong , 1st sess. (1951). The law in regard to municipalities is embryonic; there is no reason why it cannot develop favorably. As to differences of opinion between CIO and AFL groups organized in the industry, with the AFL organization supporting public power, see *AFL News-Reporter*, Jan. 16, 1952, reporting statement of Mr. Charles MacGowan, president of the International Brotherhood of Boilermakers, AFL.

Closely related have been efforts in soil and range conservation. So heavily dependent are the operations of the Soil Conservation Service on annual congressional appropriations that it has seemed best for labor to concentrate on the appropriations problem.[20] Help has also been given in fighting off special-interest legislation which would have led to serious overgrazing or even to the surrender of the ranges. Is not the interest of union members in abundant food and high nutritive content (not to mention their concern with the public welfare) sufficiently clear? Meanwhile, more and more attention has been paid to comprehensive watershed management plans as the key to both nutrition and river control.

OUTDOOR LIFE

Outdoor recreation is more and more important to union members. They have obtained greatly increased leisure through their organizations during the last fifteen years: shorter hours, longer week ends, longer paid vacations. New state and national parks and expanded camping facilities in our state and national forests are greatly needed. In consequence the CIO has lent vigorous support to such projects as the Quetico-Superior wilderness program. Again, it has urged that the Reclamation Bureau relocate the dams proposed for Dinosaur National Monument, placing them outside the boundaries, and has urged that the monument be developed promptly as a national park.[21] Considerable doubt has been expressed as to the recreational values created around the margins of fluctuating flood-control and hydroelectric power reservoirs, as distinguished from the possibilities of natural recreation in the normal river basin, if properly developed for picnic grounds and camp sites. Because union members are often sportsmen, or just plain conservationists, interest has been taken in the protection of waterfowl, game animals, and the like, where their survival is threatened by ill-advised drainage or construction. And the national disgrace of stream pollution has not gone unnoticed.

---

[16] For example, the CIO supported the Hook Bill, H. R 6221 (1946).

[17] For example, see the full text of my statement before the American Forest Congress, mimeographed, 1946.

[18] An excellent statement on the credit problem is contained in Stephen Raushenbush, *Our Conservation Job,* Public Affairs Institute, 1949.

[19] Embodied in the Douglas Bill (Roosevelt Redwood Forest Bill), H. R. 6201 (1946), H. R. 2876 (1947), H. R. 2394 (1949); see Helen Gahagan Douglas, "The Proposed Redwood Forest," *National Parks Magazine,* April–June 1947; Dewey Anderson, *An Action Program for the Redwood Forests,* Public Affairs Institute, 1949; *An Appraisal of the Economic and Social Effect of the . . . Proposed Roosevelt Redwood Forest,* U. S. Forest Service, typewritten, with maps, 1946.

[20] *Healthy Soil, Healthy People,* CIO Pamphlet No. 162; see my testimony before the Senate Sub-Committee on Agriculture Appropriations, mimeographed, 1949.

[21] I took a group of state CIO officers on an expedition into the monument in May 1951, as a result of which a consensus was reached as indicated.

VARIOUS ELEMENTS OF POLICY

Many other activities could be mentioned: the organization has fought for the retention of the off-shore petroleum resources in federal hands, development to be by the Federal Government itself or by a sound system of leasing. In respect to atomic energy, the CIO has advocated not only federal ownership but actual federal operation, as distinguished from the present system of contracting operations to monopolistic corporations.

The true synthesis of policy in conservation and development in America has not yet been fully formulated. The germ of the idea was present in the TVA, but its growth, while good, was not entire; criticism by sportsmen, recreationists, soil and forest conservationists, and watershed management experts reveals the deficiencies.[22]

The ultimate solution must place heavier emphasis on upstream watershed management (ponds, terraces, check-dams, contour plowing, strip cropping, afforestation, and so forth) as distinguished from downstream river engineering for purposes of flood control. Such a shift of attention from construction to cultivation may provide a new meeting ground for farm and labor groups. Moderation and deliberation in the pace of hydroelectric development, coupled with the necessary reasonable limitation on total construction which is inherent in balanced planning, should help to bridge the gap between proponents of public power and conservationists.

Vigorous restraints should be imposed on future reclamation and navigation schemes (one good test would be ability to repay in full); the subsidies, open and hidden, which are now being squandered on them should go to watershed management. Indeed, all river engineering (for purposes of navigation, reclamation, or power whether *private* or public) should contribute to watershed maintenance by setting up suitable reserves and making proper contributions to the maintenance of that portion of the capital plant which the watershed itself represents.[23]

Recognition of the rights of collective bargaining and concerted action for employees of publicly owned economic enterprises is essential, and should moderate potential opposition to public power by minority union groups. The assignments given by Congress to federal agencies (for example, to the Army Engineers, flood control and navigation; to the Bureau of Reclamation, "irrigate everything") must be changed so that all decisions are based on balanced plans; and some central review or planning commission, with full veto powers, must be created. The administrative policies of all agencies must be based on specified *policies,* and not on naked grants of *power.*

There are some fundamental problems of *evaluation* to be solved (all politics goes back to evaluation): Do we really want to destroy our high wildernesses by "scenic" drives, timber cutting, useless transmountain diversions? Is the "drain everything" policy of Reclamation and Agriculture to proceed without hindrance to destroy our marshlands, hence our migratory waterfowl? Is idolatry of "free" enterprise going to block yardstick hydroelectric power? On the other hand, is human welfare measurable in kilowatt-hours, but not in the quietudes and scenic grandeurs (and the rapids and waterfalls) which are so often destroyed by the big dams? Are the big-city values, the speed values, the gadget values, the important ones, or should we try to recapture the old-time natural outdoor American life in some degree? Are we capable, as a nation, as a world, of facing the population problems involved in all of this?

---

[22] For example, Frank and Netboy, *loc. cit.* note 10 *supra;* cf. *Policies and Objectives of Regional Development,* statement by the author before National Emergency Conference on Resources, mimeographed, 1949.

[23] Cf. Frank and Netboy, cited note 10 *supra,* pp. 236–37, where the suggestion is advanced that the TVA "divert all its net revenues" to watershed management.

QUESTION OF POLITICAL ACTION

No effective action, whether in appropriations, in regulation, or in planning, seems probable without an improvement, as the President said, in the congressional situation. Such improvement, in turn, awaits concerted political action. A coalition of creative forces throughout America is essential to such political action. Among such forces are the soil and forest conservation societies, the park and wilderness organizations, the wildlife and ecological societies, the sportsmen's organizations, the public power associations, the regional planning societies, the farm organizations, and the labor unions. Because the industrial union movement contains within itself so many of the interests and groups which appear to be in conflict in these matters throughout the nation, it may well contribute greatly, granted friendly co-operation from others, both to a workable policy synthesis and to the necessary working coalition.

Anthony Wayne Smith, LL.B., Washington, D. C., is assistant general counsel to the Congress of Industrial Organizations; assistant director of Industrial Union Councils, the state and city central organizations of the CIO; and executive secretary of the National CIO Committee on Regional Development and Conservation. He has served on the staff of the CIO in many capacities since 1937 and is the author of numerous pamphlets, articles, and speeches on labor and conservation matters. He was secretary to Gifford Pinchot during the latter's second term as Governor of Pennsylvania, and practiced law thereafter in New York City. He is a member of the bars of New York State, the District of Columbia, and Appellate Courts.

Conservation and Wise Utilization of Natural Resources in Canada

By H. A. Young

A COUNTRY'S approach to the conservation and wise utilization of its natural resources may in large part be determined by the character and extent of these resources. Canada is well blessed. In the field of minerals she leads the world in the output of nickel, asbestos, and platinum, producing 80 per cent, 65 per cent, and about 50 per cent respectively of the total. She stands second in the output of zinc and gold, third in the production of silver, and fourth in copper. She also ranks high in pitchblende, although comparative figures for the world's leading producers are not available. The bulk of this production goes abroad; 97 per cent of our production of nickel, 95 per cent of asbestos, 90 per cent of zinc, and 70 per cent of copper are all exported. Almost all of Canada's production of gold is exported for monetary purposes.

Recent developments in iron ore and in petroleum, while not placing Canada among the world's leading producers, are rapidly bringing her to a position of importance in those fields. Canada's production of iron ore has grown from an almost negligible quantity before the war to a current annual figure of 4,700,000 tons, and it has been estimated that it may be as much as 33,000,000 tons annually within the next decade. Known reserves of petroleum are now 1,700,000,000 barrels, 34 times as great as they were five years ago, and active exploration continues. In the past five years Canada's annual production has risen from 7,600,000 barrels to 48,000,000 barrels. Further, the famous Athabaska tar sands, 250 miles north of Edmonton, should not be overlooked. At present an economic method of extracting the petroleum from these sands has not been developed, but extensive research is being undertaken, and should it be successful, Canada will have petroleum reserves greater than all the present proved commercial reserves of the rest of the world combined.

LAND AND WATER RESOURCES

In forestry, Canada's position again is important. In 1949 she produced about 6 per cent of the world's fuel wood, 11 per cent of the saw logs, and almost 28 per cent of the pulpwood. Canadian mills accounted for 27 per cent of the total production of woodpulp and for 63 per cent of newsprint. In exports, Canada led the world (excluding the Soviet Union) in newsprint, with 83 per cent of the total, and in lumber, with 29 per cent of the total, and ranked second in woodpulp, with 29 per cent of the total.

In food products, Canada's contribution is well known. She ranks second as an exporter of wheat and of live cattle, and is an important exporter of other cereal and animal products. The coastal and inland fishing industries make her the free world's fifth largest producer of fish and the leading exporter.

In addition to all this, Canada is extremely well blessed with water-power resources. Fortunately, moreover, these are abundant in what are termed the "acute fuel zones" of Ontario and Quebec, where native coal is not economically situated but which in other respects are well suited to industrial development. In the last half-century installed hydroelectric capacity has risen from 275,000 horsepower to 13,300,000 hp.—48 times the original figure. Between 1939 and 1951 the capacity was enlarged by no less than 60 per cent. With a population of less than 1 per cent of the world total, Canada has over 10 per cent of the world's developed hydroelectric power, but even so, has developed only one-quarter of her water-power potential.

EXTENSIVE EXPORTS

One of the most significant factors about our natural resources is that the bulk of our mineral, agricultural, fish, and forest output is sold abroad. The same may be said, to a considerable degree, of our hydroelectric output; for while it is consumed in Canada, a substantial part of it goes to the manufacture of goods for export. Two large consumers of electric energy, for example, are aluminum and newsprint. The development of an aluminum industry in Canada is due entirely to the availability of large amounts of low-cost power in the vicinity of tidewater, for the raw materials are imported. The Canadian aluminum industry now accounts for about 28 per cent of world production, and nine out of every ten tons are shipped abroad. Newsprint is now Canada's largest single export; its importance in world trade has been mentioned.

The foreign demand for Canada's natural resources has been, of course, the key factor in building our economy to a point where a country of only fourteen million people—twenty-fifth among the countries of the world in terms of population—has achieved fourth place among the trading nations of the world and second in terms of high standards of living. Our pre-eminence as a foreign trader, however, is important not only to Canadians but to all the world. Under present conditions, when preparedness to resist aggression is of paramount importance, Canada's resources are once again vital to the defense effort of the free nations of the world, just as they were during the six long years of the Second World War. Furthermore, in addition to their contribution to defense, these resources can still mean better living to countries which obtain them, and it is our earnest hope that improving living conditions may create a climate more favorable to the achievement of a full and lasting peace. For these reasons the conservation and efficient development of her resources becomes not only a national but an international responsibility.

PROBLEMS OF CONSERVATION

There was a time, not very long ago, when the abundance and variety of Canada's resources seemed to convince her people that there was little need to conserve them. Forests were cut with no heed to reforestation or the encouragement of natural growth. Crops were grown with no thought to the replenishment of the life-giving contents of the soil. Drought and dust storms, lowered water tables in the prairies and in other parts of the country, flash floods followed by dried-up river beds, the disappearance of many valuable forests, and mines abandoned too early because they had been high-graded, all served to bring home the folly of profligate exploitation of resources. It is well appreciated, too, in Canada that the rapidly increasing world population, the rising living standards in underdeveloped countries, and technical developments increasing the utility of many metals and other products, are all combining to increase at a startling rate the demand for raw materials.

Nevertheless, however fully the need for conservation is recognized, it is no simple matter to put it into practice. The fact is that, over the short run, it is more costly to exploit resources with an eye to the future than with both eyes solely on the present. It is more expensive, for example, to cut a forest on a sustained-yield basis than to adopt the wasteful method of "cut out and get out." Less accessible areas may have to be cut, and a good deal of research is necessary to obtain the requisite data on rates and conditions of growth and many other matters. Then, if conservation is to be thorough, it must not be limited to the growing forest; it must cover such fields as making the fullest use of all parts of the tree, including the sawdust, and the preservation of wood and wood products, the substitution as far as possible of more common woods for those less common, and so on. All this calls for research—much research—and research is costly.

The same thing applies to minerals. More immediate profit comes from high-grading than from mixing the rich ore with that of lower grade and thus prolonging the life of the mine. Then, here again, much research is necessary to find the best methods of discovering the minerals in the ground, of extracting them from the rock, of utilizing them and protecting the finished product against stress, strain, and erosion. And in agriculture and fisheries it is also true that the wasteful method promises the largest *immediate* profit.

WHOSE RESPONSIBILITY?

Conservation is, and always must be, a responsibility of all groups in the community, including national governments and local governments; universities, private research organizations, and service clubs; large and small corporations; individual farmers, miners, fishermen, and lumber operators; prospectors, hunters, and tourists. The role of government, however, is a special one, for to a large extent it may stimulate better conservation by other groups.

The importance of government's role in conservation derives from the fact that the development of resources on sound conservation standards is not compatible with the immediate maximization of profit. It is probable that conservation will *over the long run* produce the maximum profit from resources; but as J. M. Keynes said, "In the long run we are all dead." It may be difficult, therefore, for even the most public spirited board of directors to adopt, beyond a point, more costly measures of development than appear to be necessary, merely to preserve our natural resources for the use of future generations fifty or a hundred years hence. They are inclined to argue that the very fact that it will be future generations that will benefit from conservation is a sound economic reason for *part at least* of the costs of conservation being borne by the people of the country as a whole, as taxpayers, rather than by the consumers of the raw material through higher prices, by the laborers that produce it through lower wages, or by the owners of the resource through lower profits. There is wide public acceptance of this general principle; the only dispute concerns the extent to which it should be applied—the degree to which the taxpayer by one method or another should carry the burden of conservation.

INTERGOVERNMENTAL RELATIONS

Basic to any examination of how the problem is dealt with in Canada is a knowledge of the manner in which responsibility for resource development is divided between the federal and the provincial governments. Under the British North America Act—Canada's constitution—the ownership and administration of land, forest, mineral, and water-power resources is given solely to the provincial governments, the exceptions being in the Northwest Territories and the Yukon, which have not yet achieved provincial status and where the natural resources are owned and administered by the Federal Government, and certain relatively small areas of federal land in the provinces. Concerning agriculture, the B.N.A. Act states that the provincial and federal governments shall have concurrent rights, but that provincial laws shall be valid only to the extent that they are not repugnant to federal legislation.

In practice, the provincial governments limit their agricultural legislation to problems affecting their own province, while the Federal Government concerns itself with national or broad regional problems. Both coastal and inland fisheries are a federal responsibility under the B.N.A. Act, but in regard to the inland fisheries the practice has developed whereby the Federal Government legislates in accordance with provincial desires and leaves the administration of this legislation to provincial authorities.

However, although the provincial governments have complete jurisdiction over certain resources, the Federal Government has also a valid interest in conserving and developing these resources and can properly give assistance in doing so, provided that such assistance is given in agreement with the provincial governments concerned. The Minister of Resources and Development has pointed out that in cases where natural-resource problems spread beyond provincial or national boundaries, or where the resource is of such a type and is available in such quantities that its development requires a truly national effort, joint federal and provincial action may be desirable.

CARE OF FORESTS

Government policy relating to the conservation of a particular resource is determined in part by whether the resource is renewable or nonrenewable. For example, in the case of a renewable resource such as forests it is generally recognized that the goal must be to achieve sustained yield; that is, the rate of depletion—by cutting and by loss through fire and disease—must not exceed the rate of replacement by natural growth and reforestation. Both the provincial governments and the industry recognize this, and important steps have been taken to frame provincial legislation and industrial practice so as to achieve this end.

To facilitate co-operative efforts by the provincial and federal governments to improve the care and management of Canada's forests, Parliament in 1949 passed the Canada Forestry Act, which provides, among other things, for the Federal Government to enter into agreements with any province for the protection, development, or utilization of forest resources. Unfortunately, the need for increased defense activities coming shortly after the passage of this act has up to the present restricted the extent of federal activities. Nevertheless, in the summer of 1951 the Minister of Resources and Development announced that the Federal Government was entering into an agreement with the provincial governments to give financial assistance in the taking of a reliable and complete forest inventory, and in encouraging reforestation. He pointed out that a forest inventory is essential before a policy to achieve sustained yeld can be successfully planned, and that reforestation is badly needed in certain cut-out areas which will not regenerate themselves naturally and where forest cover is necessary not only for the development of forest projects but also in the interest of soil conservation, flood control, cover for wildlife, and other uses.

For many years past, the Federal Government has assisted in forest conservation by extensive research. Forestry research is carried on in Ottawa and through five district offices and five forest experiment stations situated in different regions throughout the country. It covers silviculture and forest management, forest inventories, and fire protection research. It is designed to provide solutions to many technical problems encountered in improving forest management. Forest products research is undertaken in two forest products laboratories, one in Ottawa and one in Vancouver. It covers such fields as wood utilization, wood preservation, timber mechanics, and wood chemistry. There is in addition an experimental sawmill in Ottawa.

AGRICULTURAL IMPROVEMENT

In agriculture much has been done by precept to teach better methods of farming, and research is carried on by almost forty agricultural experimental stations throughout the country. A particularly interesting project is that undertaken by the Federal Government under the Prairie Farm Rehabilitation Act. This act was passed in 1935 to provide for the restoration of substantial areas in Manitoba, Saskatchewan, and Alberta. Federal funds on a large scale were made available for assistance to these provinces. The federal Department of Agriculture directed the work, but joint federal-provincial committees co-ordinated the work of all agricultural bodies, including that of some private commercial and financial organizations.

This act is still in effect. Its work is divided into three main divisions: (*a*) land culture practices, (*b*) land utilization, and (*c*) water development. The Federal Government provides funds and direction for the construction of water reservoirs, for economic and soil surveys, for land classification and determination of use, for the study of cultural practices, and for the provision of illustration stations to demonstrate the proper use of land for the regrassing of devastated lands and for the establishment of community pastures. Combined with these undertakings there has been an extension of federal research in a broad range of subjects such as soils, forestry, entomology, crop production, and agricultural engineering. This work, started in 1935, is continuing and has expanded into other provinces as agreements between the federal and provincial authorities have been concluded.

FISH CONSERVATION

The responsibility for fish conservation, except in certain of the inland fisheries, is exercised by the Federal Government. The general policy is to manage the resources in such a manner as to allow maximum production for use, yet guarantee the supply in perpetuity. Effort toward this end is directed along two lines: (*a*) protection of the existing stock to allow sufficient individuals to spawn, and (*b*) improvement of environmental conditions to permit more efficient use of the spawning areas.

To provide basic information on which to design proper procedures for the protection of the existing stock, the Fisheries Research Board of Canada is constantly investigating the life histories of the various species and estimating population abundance. For those species where it is indicated that exploitation may be reaching dangerous levels (for example, Pacfic salmon, Pacific herring, Pacific halibut, lobsters, Atlantic salmon, Atlantic smelts, clams, and in some instances whitefish), pertinent restrictions are applied in the form of minimum lengths, closed seasons, closed areas, catch quotas, and so forth. Improvement of environmental conditions to encourage more efficient spawning and incubation is restricted almost wholly to anadromous and fresh-water fishes, such as salmon, smelt, and trout. This work may be expected to develop greatly in a country such as Canada, where increasing industrialization will more and more tend to put water to various uses and increase the discharge of wastes. At the present time, the main problems are created by water-power developments, and pulp and lumber mills.

MINERAL CONSERVATION

Since minerals fall in the class of nonrenewable resources, their conservation, from the theoretical point of view, presents a problem different from those we have so far discussed. There is no simple criterion by which to determine the rate of exploitation that should be permitted, such as is provided in the case of forest, soil, and fish resources by the goal of sustained yield, because by definition there is no such thing as sustained yield in a nonrenewable resource. The question as to the extent to which the taxpayer should bear the burden of increased production costs necessary to prolong the life of a mineral deposit can be answered only on an empirical basis.

In Canada both federal and provincial governments follow the general practice of encouraging mineral conservation by the indirect method of reducing costs so as to encourage the production of lower grades, rather than by direct controls. Mineral rights, once they are relinquished to private enterprise, generally become the property of the company or individual concerned, and no conservation policies are enforced. An important exception, however, is found in the case of natural gas and petroleum resources in the province of Alberta, where the Petroleum and Natural Gas Conservation Board exercises strict control over the number of wells and the volume of production.

Financial encouragement to the mining industry is given by favorable income tax provisions during the development and early production stages of a mine and by government assistance in the construction of transportation facilities—railroads, roads, landing fields, docks, and so forth—in remote areas. The government furthermore undertakes geological, topographical, and other surveys which are basic to the discovery and development of mineral resources, and, through the Mines Branch of the Department of Mines and Technical Surveys, carries out extensive research in a very wide range of problems concerning the discovery, extraction, processing, utilization, and preservation of minerals.

THE OVER-ALL PICTURE

To sum up, the policy of the Federal Government in Canada is to create an economic climate favorable to the exploitation of natural resources by private industry to the maximum degree compatible with principles of sound conservation. Within provincial jurisdictions the specific policies vary somewhat in detail, depending on the historical background, local conditions, and the ideology of the current provincial governments. Putting all these government policies together with the activities of corporations, institutions, and individuals concerned, it is not boasting to maintain that Canada realizes her responsibility as one of the world's greatest natural resource storehouses and that she is striving to ensure that these resources are exploited prudently and used wisely.

Major-General Hugh Andrew Young, C.B., C.B.E., D.S.O., Ottawa, Canada, is Deputy Minister of Resources and Development and Commissioner of the Northwest Territories. He is a director of the Central Mortgage and Housing Corporation; chairman of the Arctic Research Advisory Committee (Defence Research Board); member of the Board of Governors of the Arctic Institute of North America; member of the Board of Directors of the Canadian Geographical Society; and member of the Board of Directors of the Pulp and Paper Research Institute of Canada.

Book Department

PAGE
INTERNATIONAL RELATIONS AND WORLD GOVERNMENT . . 203
AMERICAN GOVERNMENT, HISTORY, LAW, AND POLITICAL THEORY . . 207
ECONOMICS AND INDUSTRY . . 214
SOCIOLOGY AND EDUCATION . . 218
PHILOSOPHY AND RELIGION . . 235

SPECIAL TOPICS ABROAD

COMMONWEALTH OF NATIONS . . 238
SLAVIC COUNTRIES . . 246
WESTERN CONTINENTAL EUROPE . . 252
OTHERS . . 258

INTERNATIONAL RELATIONS AND WORLD GOVERNMENT

KIEFFER, JOHN E. *Realities of World Power.* Pp. xiii, 326. New York: David McKay Company, 1952. $4.00.

Proudly publicized as a geopolitical blueprint for the layman, with particular reference to the American strategic position, John Kieffer's recent work sets out to combine ambitiously the main principles of geopolitical doctrine with a current appraisal of the world political scene. Although he signally fails in his first objective, his challenging and belligerent observations often hit the mark on the practical side of the picture. The reviewer's principal impression is that the book is extremely uneven, hastily written, and filled with emotional outbursts which not only astound the academician, but which will cause most readers to lose the thread of the author's discussion. The weakest part of the book is the introductory section, the chapters dealing with the historical background and fundamental factors of the pseudo science of geopolitics. The author gingerly sidesteps any attempt to offer a clear-cut and intelligible definition of geopolitics which is mysteriously labelled as an "almost diabolical plot to forestall our efforts" (p. 5). A few pages later a larger and more confused definition is given, broad in its outlines to the point of meaninglessness.

The first hundred pages display a tendency to underestimate the significant theoretical aspects of twentieth-century geopolitics. The reviewer would strongly dispute the statements that "the principles of geopolitics are simple," and that "the global concept is only the application of common-sense thinking to world areas" (p. 6). Based on these oversimplified assumptions, the discussion of the fundamental factors of geopolitics and of geostrategy assumes the form of a superficial primer. Particularly disturbing is the complete absence of documentation which is essential to the interpretation of background-theory. Important works are briefly mentioned by reference to volume, without giving precise quotations or a more exact indication of the source itself. The book, incidentally, has no index, no appendixes; and its entire bibliography consists of eleven generally known textbook titles.

The major part of Kieffer's work is based on a detailed survey of the world's "strategic power areas." This is by far the most useful section of *Realities of World Power,* and the reader will find valuable information in the well-written chapters on the United States, Great Britain, France, Spain, and Italy. However, the author's analysis of the explosive Spanish situation is lopsided and misleading. The condemnation of Spain in the United States is not the result of pro-Communist propaganda; the *rapport* between the democracies and Franco is indeed a dangerous experiment, even if the author explicitly disregards the moral aspects of an exuberant friendship with the Spanish dictator. Similar political misjudgments mar the chapter on Germany and the geopolitical review of Tito's Yugoslavia. It is probably justifiable to characterize Tito as "a political opportunist whose primary interest is power for Tito" (p. 229). At the same time, much more emphasis should be placed on Tito's determined challenge of the imperialistic structure of Stalinism, and on the strategic value of a Western alliance with the Yugoslav outpost.

On the whole, the author is at his best in the survey of the United States and of Western and Central Europe. The farther he drifts from these well-charted regions, the more lightly does he tread on the dangerous ground of political problem-areas. The Near Eastern and Far Eastern sections are particularly confusing and hesitant. They detract considerably from the over-all value of preceding chapters, which are lively and often informative. The final chapter on "The Common Problem and the Future" reasserts the primacy of power politics and hotly denies the role of moral considerations in the author's own perspective of "geopolitics." He reveals the characteristic theme of this emotionally inclined and controversial work in a closing comment: "We have said much about idealism, and all of it has been in a contemptuous vein."

ANDREW GYORGY

Yale University

KORNER, EMIL. *The Law of Freedom as the Remedy for War and Poverty.* Translated from the German by H. Leigh Farnell. 2 vols. Pp. xxiii, 562; vi, 668. London: Williams & Norgate (distributed in U. S. by the British Book Center), 1951. $9.50.

This scholarly and closely-reasoned work defends the thesis that poverty and war are to be overcome, not by democratic or autocratic socialism, but by capitalism operating under conditions of genuine freedom. Perhaps its chief attraction consists not so much in its positive program as in its illuminating attack on both the untruthful foes and the misguided friends of liberalism.

The first volume considers economics in its setting of psychology, philosophy, politics, and history. Besides dealing with popular fallacies, it presents two basic principles in the social economy of "means," or valuable goods The final *use* of means should be governed by the ethical principle: "Develop your own self as you would that your nearest and dearest should develop his." And the *acquisition* of means should be governed by the economic principle of freedom of choice, but on the understanding that the "law of freedom" is always subject to this limitation: "What you would not have done to you, never to another do, and do not allow it to be done to anyone else." Thus the basic functions of the political state are two: to protect freedom, and to exercise for individuals the precautions which they would exercise for themselves if they could.

The second volume is devoted to a number of problems in economic theory and political practice. Outstanding are the problems of "unemployment" (interpreted as the total unemployment of some workers) and "full employment." The first of these problems can be solved by fixing a minimum wage rate and so varying the maximum hours of work that the total volume of labor demanded at any time is distributed automatically among the total number of willing workers. The second problem, although no satisfactory solution of it is known, may be made less serious by relaxing the existing limits on both consumption and production. Here it is important, not merely to maintain equality, in terms of exchange value, between total productive services and total product, but to do so by means of a monetary standard whose real buying power is stable. For this purpose only one kind of productive service needs to have a stable price, and the most suitable kind is unskilled labor. What we should do, then, is link a fixed minimum money wage with a variable maximum working week. To illustrate, dollars might be issued subject to the condition that not less than forty dollars shall be paid for a working week of, say, forty hours.

It is only within a "world state," Korner holds, that freedom can be realized and war abolished, since any national state can be prevented by another from carrying the law of freedom into effect. If we do not voluntarily construct a free world state, we may have a totalitarian world state imposed on us. Depending on one's concern for freedom in its present struggle with state control, one may or may not approve the vigor with which Korner assails Marx, sometimes Keynes, and occasionally such writers as Drucker and Vaihinger; but in any case the quality of the assault is likely to be respected.

BRUCE KNIGHT

Dartmouth College

MIKESELL, RAYMOND F. *United States Economic Policy and International Relations.* Pp. xii, 341. New York: McGraw-Hill Book Company, 1952. $4.75.

With this broad-gauged and scholarly treatise, Professor Mikesell has signally contributed to a major field of study which, despite the appearance of numerous technical and theoretical discussions, has long suffered from the lack of a comprehensive survey of our foreign economic policy. Indeed, the prevalence of the piecemeal approach to isolated aspects of this multifaceted subject has tempted occasional observers to doubt the existence of any such policy. Without denying or belittling the significance of numerous inconsistencies and paradoxes, Mikesell shows how historical and analytical techniques can be made to yield a definite rationale which reflects both the fluctuating aims of our foreign policy and our basic traditions of economic liberalism. Addressing himself to the dominant problems and policies of World War II and its aftermath by way of a succinct historic review of interwar developments, the author skillfully highlights the change in the country's international accounts after World War I, its attitudes toward war debts and foreign lending, and the protectionist refusal to adjust to the new realities before and during the great depression. His discussion of international monetary policies during this period compares central bank co-operation in the 1920's with the Treasury's efforts toward stabilization in the 1930's and leads him to the conclusion that the earlier Federal Reserve activities represent "a more substantial contribution" than the actions of the Treasury; this judgment might be somewhat qualified by reference to the depression-born pressures which had made the failure of the 1933 London Conference very nearly inevitable once the proclamation of Empire preferences at Ottawa in 1932 had virtually invited competitive exchange-rate depreciation.

The main part of the book offers a systematic exposition of the principal postwar aspects of international monetary and investment policy. The presentation is marked by commendable restraint and a fitting sense of proportion in assessing the many crosscurrents which left their mark on the emerging institutional and policy pattern of the recent past. This reviewer happens to share the author's view that "the most essential key to the elimination of discriminatory trade and exchange controls lies in the restoration of Sterling-Dollar convertibility"; however, he may perhaps be permitted to ask whether this view would not call for some comment on the failure to deal more realistically with the war-generated sterling balances than was done in the 1945 Anglo-American Financial Agreement. The discussion of exchange rate and gold policy is thorough and lucid, but might usefully have included a reference to the misguided wartime attempts to "aid" occupied areas by fixing exchange rates there according to purist concepts. The treatment of such organizations as World Bank and Fund, Economic Cooperation Administration (ECA), and European Payments Union (EPU), and of the Point IV and International Trade Organization's General Agreement on Tariffs and Trade (ITO/GATT) programs is competent and to the point. The struggle over postwar commercial policy forms the subject of a vivid chapter which illustrates the political shortcomings of our agricultural policies. The book closes with an outline of the new directions which the defense effort has imparted to our foreign economic policy; regrettably, the last two chapters do not mention the East-West trade problem despite its relevance to their subjects. This may, however, not have been possible within the necessarily restricted scope of the "Economic Handbook Series" of which this volume is one. In fact, it is this degree of condensation which makes the book valuable as collateral reading for advanced courses, although its main appeal should be directed to the wide audience of informed general readers.

ADOLPHE J. WARNER

New York City

WARBURG, JAMES P. *How to Co-exist Without Playing the Kremlin's Game.* Pp. viii, 228. Boston: The Beacon Press, 1952. $2.75 cloth; $1.00 paper.

James P. Warburg is a critic, although a restrained and moderate critic, of the present trend of American foreign policy. He finds it too "tough" with the Soviet Union, too negative and lacking in broad constructive blueprints for promoting peace and disarmament and for promoting a crusade against poverty and distress all over the world.

As a means of "co-existing" with the Soviet Union "without playing the Kremlin's game" he offers "six imperatives" for a new policy, which may be briefly summarized as follows:

Help develop a plan for peace through which universal enforceable disarmament under law would become a practical possibility.

Help develop a worldwide co-operative program of economic development and social reform, aimed at liberating all mankind from hunger, poverty, disease, and oppression.

Do not betray the basic principles of a free society in the name of cold war expediency.

Build up the military power of the free world, but in such a way as to "combine the maximum deterrent with the minimum of provocation" and not to undermine the economic strength and political stability of the nations which are resisting aggression.

However attractive these proposals may sound, the obstacles to their realization are a good deal more formidable than Mr. Warburg seems to recognize. To find a common denominator of "law" which would satisfy both the Communist states and the free states is not difficult; it is starkly, flatly impossible. Given the Communist philosophy of implacable hostility to the "capitalist" world and the Soviet record of international bad faith, it is certainly difficult to conceive any formula that would insure "enforceable disarmament."

The United States is carrying such a heavy load of rearmament expenditure (and there is as yet no assurance that we are ahead of the Soviet Union) that a large-scale plunge into an international giveaway program would be much more likely to bankrupt the United States than to end poverty in "underprivileged" areas of the world.

The author is no doubt sincere in his professed abhorrence of communism. Yet most of his concrete proposals, notably the abandonment of German rearmament and a hands-off attitude toward Formosa, would almost certainly pave the way for big new Communist advances, both in Europe and in Asia.

His suggestions for a united Germany and a united Korea, based on free elections, seem to skip very lightly over the obstacle presented by the frozen indoctrination in Communist mental molds imposed upon East Germans and North Koreans. A general criticism of the book is that the author does not take adequate account of such aspects of the Soviet Communist problem as the inflexibility of the Soviet rulers in pursuing their aims and the range of political and psychological instrumentalities by which they hold in subjection the peoples within their orbit and wage unceasing warfare against the nations outside that orbit.

The force of the book's argument is weakened by a rambling, discursive style, although the author tells one good story on himself. It seems that his career as a publicity man for the Baltimore and Ohio Railroad came to a swift end when he came up with the slogan: "Take the B. and O. Between New York and Washington—and Avoid the Crowds."

WILLIAM HENRY CHAMBERLIN
Cambridge, Massachusetts

HARRISON, JOHN B. *This Age of Global Strife.* Pp. ix, 470. Philadelphia: J. B. Lippincott Company, 1952. $5.50.

Professing to eschew a "heavy, technical, fact-crammed" text and "the kind of cynical detachment and moral relativism" that precludes firm conclusions or moral judgments, Professor Harrison has attempted in this book for the college undergraduate and for the general reader "a sound historical account of the major world events of the immediate past which give meaning to most of today's world problems" (p. vii). Such an ambitious and commendable undertaking requires thoroughness and objectivity in studying the data, perspective and good judgment in choosing the themes to be stressed, and nicety of diction in order that the generalities and conclusions reflect, with the least possible distortion, the minutiae omitted. These requirements the author has not sufficiently appreciated, or at least has not always well fulfilled.

He is most open to criticism for Part I, "The Coming of World War II," especially its first three chapters which start with "The Rise of Germany to Dominance in Europe" and carry the story through the settlement of 1919. He exaggerates the iniquity of Germany, betrays a startling ignorance of the outcome of the Balkan crises preceding 1914, and misrepresents the character of the Triple Entente, particularly Great Britain's role in it. Little slips in this section, such as a "wizened" Lloyd George in 1919 and "the international Curzon Commission" (which never existed), suggest imperfect mastery of details. Moreover, the choice of material in this part provides an inadequate basis for understanding the denouement discussed in the last section, half of which is devoted to Soviet-American rivalry, unless we assume that the technology, politics, economy, and ideology of today are mainly the direct result of two world wars.

On the other hand, Professor Harrison has written well, indeed admirably, about World War II and the "Cold War" since 1945. These sections, which constitute four-fifths of the book, reflect a firmer grasp of primary sources, a more satisfactory, though a still too narrow, selection of material, and a more felicitous exposition. Most praiseworthy is his treatment of Soviet-American relations, whose discords he dates from April 1945. Here he is courageously free from the partisan and semihysterical interpretations that recent rivalry has fostered. For this his book deserves high praise and a wide audience.

DWIGHT E. LEE
Clark University

AMERICAN GOVERNMENT, HISTORY, LAW, AND POLITICAL THEORY

GRASSMUCK, GEORGE L. *Sectional Biases in Congress on Foreign Policy.* Pp. 181, xv. Baltimore, Md.: Johns Hopkins Press, 1951. $2.00.

In the attempt to develop a more precise political science the techniques of statistical analysis are being applied to many new fields. Studies of voting behavior have contributed new insights and supplied useful correctives to conceptual assumptions of an earlier period. The present volume represents the application of the same techniques to the behavior of Congress in the field of foreign policy.

By measuring roll call votes for and against selected categories of foreign policy legislation during two periods: 1921–1932 and 1933–1941, the author is able to report on the attitudes reflected by party and section on certain foreign policy issues.

Party and section may vie with one another for preponderant weight in any given legislative situation. Party emerges as the single most influential factor although this influence is not expressed as a continuous or consistent adherence to a particular substantive policy. Quite the opposite. For example, during the twenties Republican congressmen tended to support the foreign policy of the Republican presidents, and this policy favored a strong international position. Throughout this same period Democratic congressmen tended to oppose this position.

In the thirties, however, Democratic congressmen gave generally firm support to the increasingly forceful international policies of the Democratic administration while Republican congressmen shifted to a position of opposition. Party asserted itself in organizational rather than doctrinal terms.

Comparatively, sectional influence seems to be linked more closely to policy predispositions. Dr. Grassmuck discovers a high degree of continuity in the voting behavior of the successive representatives from a particular district or state. He reasons that this tendency toward consistency reflects the fact that the congressman is a constituent of, as well as the representative of, his district. The geographic, demographic, economic, and social factors that condition voting attitudes remain relatively constant. These influences impart a strong local orientation to the congressman's voting behavior on any specific issue.

When this predisposition toward localism is countered by strong administration support of a contrary position, congressmen of the party in power must resolve this conflict. When this occurs such considerations as the differing party mechanisms of the two houses, the strategic power of the executive, and the relation between the foreign policy issue and domestic economic factors will determine the congressman's decision.

These complex interactions receive discerning treatment in this carefully reasoned and well written book. One may disagree with some points of emphasis, but the author has presented a useful analysis that contributes needed refinement to our understanding of congressional voting behavior. More such studies are needed.

LAWRENCE H. CHAMBERLAIN

Columbia University

HALLENBECK, WILBUR C. *American Urban Communities*. Pp. xi, 617. New York: Harper & Brothers, 1951. $6.00.

Professor Hallenback has attempted, within the compass of a single book, to present a detailed study of the whole, many-sided problem of the urban community. This is an interesting and provocative account of urban social life (in the United States only) in which hardly a single aspect of this complicated problem is omitted.

In his introductory chapter, "The Study of Cities," Professor Hallenbeck carefully sets down a series of hypotheses and assumptions which serve as guideposts for his presentation of materials throughout the study. Here, too, he lays out the general outline of the work.

It must be admitted that the author has essayed a difficult task, merging, as he must, the findings from a number of fields—history, government, economics, sociology, social work—as they bear upon investigation of the urban community. Considering the breadth and scope of the problems covered, the author has done a very creditable job of research, generalization, and integration of the data used in the study.

The work embraces thirty chapters arranged in seven parts, though limitations of space preclude specific comment on any part except the last. Among the subjects treated are: the historical development of cities, regionalism, the form and structure of cities, municipal government and politics, major social problems (poverty, disease, delinquency, crime), major areas of organized social life (health, education, recreation, religion), changes in structure and function of urban families, city planning, and suggestions for the development of a more ideal community now and in the future.

Throughout the work the author utilizes a vast array of statistics derived from many sources, including the United States Census Reports, and from a myriad of spadework studies carried on by students of urban life in widely distributed cities throughout the United States. Whenever possible statistical correlations are employed in an effort to establish standards of "goodness" for measuring urban communities as well as for many other purposes. Graphs and charts are freely employed to show all manner of measurable changes in urban life, but more particularly to present census data. The student is introduced to and made aware of the vast and growing importance of census tracts as devices for understanding neighborhoods and communities. A wealth of demographic data is presented although a few of these pictorial and graphic accounts suffer somewhat from lack of size and color. The methodology used throughout the work is predominately inductive.

Part Seven, containing three chapters, is devoted to "Cities and the Future." Chapter 28 contains a thorough summary of the history, philosophy, principles, and operation of city planning in United States, with incidental reference to the London County Plan. The author manages to convey a broad picture of the growing impact of such planning, with the principles involved spelled out step by step beginning with community commitment to the planning process and ending with a program of priorities for the execution of the plan.

Chapter 29 is devoted to a review of the almost boundless opportunities for the good life available to people living in urban communities. However, it was deemed necessary to recognize the grievous lack of widespread citizen participation in community affairs and to explain the reasons for this baffling social phenomenon.

Possibly the most interesting and, in a sense, the most controversial part of the work is reserved until last (chapter 30) where Professor Hallenbeck, relying heavily upon the method of statistical calculation for setting urban standards, maintains that within broad limits, the ideal urban community of tomorrow can be created if men but have the will to attempt it. Underlying the whole approach is the assumption that there is urgent need for decentralization of urban areas based upon constellations of smaller cities planned and built around large central cities. Ideally, then, the large central cities and the smaller units would act together functionally to create a more perfect urban community.

The work is thoroughly documented and contains suggestions for supplementary readings at the end of each chapter.

George S. Hart

California State Teachers College
California, Pennsylvania

Stephenson, George M. *The Puritan Heritage.* Pp. 282. New York: The Macmillan Company, 1952. $3.50.

The author of this vigorously written book has been for many years a professor of American History at the University of Minnesota, and presumably the materials in this volume have, through the years, constituted a distinctive emphasis in the author's presentation of his subject. What he has done here is to put the influence of Christianity where it belongs in the stream of American history, quite in contrast to most American historians who have almost completely left it out. It is indeed a strange presumption, in the light of what this book reveals, that American civilization can be understood without taking into enlightened consideration the things of the mind and spirit. Yet, strange to say, that is just what the mine-run of American historians are attempting to do. Professor Stephenson is well qualified to place stress upon this influence. Twenty or more years ago he made a painstaking study of the religious aspects of Swedish immigration, publishing the results of his researches, after spending a year in Sweden on a Guggenheim scholarship. The study is a model of its kind and throws a flood of light upon one great stream of immigration which has enriched American life both in its spiritual and material aspects.

In this compact volume Professor Stephenson follows all the main currents which have gone into the making of our distinctive American heritage. The New England Puritans, the Quakers, the Unitarians, the Methodists, the great colonial awakenings, the part revivalism played in taming the west, the many benevolent agencies which arose to keep the things of the spirit alive on the frontier—the home missionary societies, the tract and Bible societies, temperance societies, all of which are given cogent treatment in several short but adequate chapters. The author does not bemoan the fact, as many less understanding writers have done, that America, by the end of the colonial period, was dotted with numerous "religious experiment stations." It was religious diversity which made these experiment stations possible and put into the Constitution of the

United States one of its finest, if not *the* finest, provision, the guarantee of religious freedom—and "not religious toleration, which assumes a privileged church." Unlike other colonizing nations, the English colonies were open to all, and thus there developed a wide toleration of religious differences.

The book ends with three chapters dealing with two of the most exciting episodes in American history—first, the swarming of the Catholic Irish to these shores and the natural resistance to them and their old world religious pattern, and, second, of slavery and the resistance to it, which created the most tragic era in American history.

WILLIAM W. SWEET

Southern Methodist University

JOHNSON, GERALD W. *This American People.* Pp. xii, 205. New York: Harper & Brothers, 1951. $2.75.

Mr. Gerald Johnson in this suggestive little book takes the ideas about human nature and human society with which the founders of the United States worked and asks how true, how valid, how workable they are today. This is not a new enterprise. Almost all who are concerned with political ideas today have had a try at this problem. Mr. Johnson's originality lies in his deliberately unacademic, man-to-man style. He is writing not for the scholars but for the people. Yet he keeps the discussion at a high level; this intimate colloquy with puzzled Americans just escapes the folksy, the deliberate writing-down, the patronizing. It is a balanced, temperate discussion of our current political problems, seen in the light of our habits, feelings, traditions, dispositions.

The central point Mr. Johnson makes is that government as our eighteenth-century forefathers established it in this country exacts much from many—just possibly too much. Our difficulties spring not from the wrongness of the moral and political basis of the republic, nor even from the alterations time has made in the conditions of life on this earth—though Mr. Johnson admits these conditions have changed greatly—but from the seriousness of the strain our democracy puts upon ordinary human nature. Indeed, the more than half our people who do not even vote in national elections have already given up under the strain. Mr. Johnson refuses to count them as Americans.

He is not, however, basically pessimistic. He thinks the other half, if it will take seriously the duties of government by discussion, if it will live up to the challenge of greatness, can still keep within hailing distance of the ideals of the Founding Fathers. He does not, as do men like Reinhold Niebuhr and the more pessimistic social psychologists, seriously question the fitness of these eighteenth-century ideals to a twentieth-century society.

CRANE BRINTON

Harvard University

DANGERFIELD, GEORGE. *The Era of Good Feelings.* Pp. xiv, 525. New York: Harcourt, Brace and Company, 1952. $6.00.

Traditionally the term, "Era of Good Feelings," has been used to designate the eight years of Monroe's presidency. Mr. Dangerfield thinks there was little good feeling after the first two years when the Panic of 1819 initiated a bitter depression with consequent social and political repercussions. Here indeed was the seedbed of Jacksonian democracy.

However, this study begins its investigation with the Twelfth (or "War Hawk") Congress which was set ablaze with the news of the Battle of Tippecanoe. With the exception of the battle of New Orleans little attention is paid to the War of 1812, but the negotiations leading to the Treaty of Ghent are detailed. This event is illuminated with the current background of British politics, and one could scarcely find a better account of how the American commissioners—Adams, Clay, Gallatin, and Bayard—wore down the British commissioners and ended an inglorious war without budging on the points their opponents insisted upon and without loss of a foot of American territory. The English recognition of the value of American trade and the imminent decline of mercantilism had been solvents of the impasse.

Also contributing to the termination of good feelings was the "firebell in the night," the bitter sectional controversy over slavery uneasily resolved by the Missouri Compromise. Here the real grievance of the North was not the sin of slavery but the advantage held by the South in Congress and Electoral College due to the three-fifths rule in counting slaves. The twenty-four years of the Virginia dynasty were largely due to this advantage.

Nearly a hundred pages are devoted to the "diplomacy of coal and iron" in explaining the British maneuvering that unintentionally culminated in the breath-taking Monroe Doctrine. This reviewer knows no finer treatment than this up-to-date exposition of that landmark in our foreign policy. The British shift away from mercantilism is again given weight in explaining the event.

This study closes with a hundred pages on Adam's nightmarish administration. Dangerfield seems to accept the "bargain and corruption" charge against Clay and Adams as if proved The Adams-Clay program was a Neo-Federalism designed to recover the lost dominance by business. Monroe's administration had attempted a definition of agrarian rights which soon found their symbolism in Jackson who as President established these rights by defying the emerging industrialism.

A more comprehensive exploitation of the pertinent sources can scarcely be imagined. The final hundred pages consist of bibliography, citations, and notes. But the enormous mass of material has been sifted with a keen intelligence, and thoroughly digested and assimilated with a resulting admirably integrated treatment of the subject. The author, a naturalized American citizen, may puzzle American readers with such Anglicisms as Louisiana Purchase "stock" instead of the American term "securities" or "bonds." "Gouts of water" is delicious dialectical English. So well is this book written that the reviewer suspects an inherent acumen has here been whetted to rapier keenness by the Oxford tutorial.

WILFRED E. BINKLEY

Ohio Northern University

SHULIM, JOSEPH I. *The Old Dominion and Napoleon Bonaparte: a Study in American Opinion.* Pp. 332. New York: Columbia University Press, 1952. $4.50.

This is apparently a doctoral dissertation. The subject is Virginian opinion—Republican, Federalist, and Tertium Quid—about Napoleon down to 1809, by which time, according to the author, that opinion in its different forms had become fixed. He says he has tried to make an exhaustive study of it. What he has produced is an exhausting piece of reportorial work supported by 835 footnotes and a 25-page bibliography. The text is dreary reading, for it is full of repetitious quotations that add nothing to our knowledge, and it is almost empty of criticism or interpretation. For all the show of finished scholarship, this is a job of scissors and paste. A doctoral candidate who turns out a thesis of this kind deserves pity rather than blame. The blame should fall heavily on his mentors, who are responsible for seeing that he has a task worth doing and that he does it well.

A. L. BURT

University of Minnesota

LEONARD, V. A. *Police Organization and Management.* Pp xviii, 507. Brooklyn: The Foundation Press, 1951. $5.00.

This book deals almost exclusively with the problems of American municipal police. Forms, procedures, and similar illustrative materials are freely employed and occupy well over one-half of the total bulk. Such materials are largely drawn from Pacific Coast jurisdictions, especially Seattle and Berkeley.

Four pages are devoted to a record of earthquake shocks in western Washington since 1930. Sixty pages, which appear to have been taken in their entirety from an academic catalogue, list the various curricula offered by the Department of Police Science and Administration at the State College of Washington. One-third of the chapter on the police executive is concerned with the announcement circular and application form used in an examination for police chief in Seattle.

Some of the illustrative materials already are outdated. The range of salaries paid to chiefs of police is for 1946, despite the inflationary changes of the past five years and the ready availability of current data. Swiftly changing practices concerning one-man patrol cars are not well represented by a tabulation for January 1, 1944, when manpower shortages controlled police deployment. Other examples abound on every hand.

Editorial and manufacturing standards are low. No uniformity is observed in the length of type pages. If tabular matter requires an entire page, the preceding page breaks off at the point where the table originally was inserted in the text. What appear to be the identifying slugs used by the compositors in each galley of proof have been carried over onto many of the printed pages. The subject index is wholly inadequate and quite useless.

Such strictures should not obscure the fact that Professor Leonard has substantial qualifications for police authorship. He has wide and varied experience with police problems and he has some illuminating and helpful things to say about them.

Ten chapters, six appendixes and a bibliography are concerned with the police executive, organization, selection and training, records administration, patrol and other line units, strategy and tactics, and measurements of police efficiency. We like best his Chapter 7: "Patrol—Major Component of Manpower." It is so clear, coherent, and penetrating in its analysis as to constitute the best treatment of the subject that we have seen.

BRUCE SMITH

Institute of Public Administration
New York City

PHARR, CLYDE, in collaboration with THERESA SHERRER DAVIDSON and MARY BROWN PHARR (Translators and eds.). *The Theodosian Code and Novels and the Sirmondian Constitutions.* Pp. xxvi, 643. Princeton, N. J.: Princeton University Press, 1952 $20.00.

This stupendous, complete, scholarly translation, the combined prolonged effort of over twenty specialists, is one of the most important books published in our generation and should be on the shelves of every college library and every public library.

The *Theodosian Code,* drawn up by a nine-man commission working from 429 A.D. to 438 and unanimously approved by the Roman Senate in the year 438, codifies the legislation of the Roman Empire from the time of Constantine in 313 to the reign of Theodosius II in 438. The *Novels* contain the decrees in both eastern and western empires from 438 to 468. Professor Pharr and his associates, working since 1932 with assistance and subsidies from numerous foundations, universities, and private individuals, and with the generous co-operation of the Princeton University Press, have produced the only English translation of the richest single source and the only official collection of contemporary information on the political, social, religious, and economic conditions of the later Roman Empire.

This book's great importance arises from the fact that the period from 313 to 468 A D. has taken on high significance among modern social scientists. It was more like our own times in its problems and developments than perhaps any other era in history. This is well pointed out by C. Dickerman Williams of the New York Bar in a brilliant but brief introduction. Sections of the code deal with such modern topics as price fixing, inflation, currency control, black markets, and conscription and regulation of labor. Scores of laws regulate a complicated bureaucracy, so overweening as to be virtually out of control. Page after page of laws and regulations strike desperately at corruption in government bureaus and set up an intricate system of secret service and confidential agents to report upon government officials, upon tax evaders, and upon each other.

This Code presents perhaps the best, certainly the most realistic, picture in all literature of a full-blown socialized state. Henry Charles Lea once wisely said that "the surest basis of investigation for a given period lay in an examination of its jurisprudence, which presents without disguise its aspirations and the means regarded as best adapted for their realization." Modern social, political, and especially economic theorists should keep copies of this great code upon their dasks as an antidote to much loose and wishful thinking, for the Roman State owned and operated both heavy and light industries such as mines, quarries, munition factories, textile mills, the building trade, glass and iron works, shipping, and the public post, and had a passion for regulating everything. Many industries not directly owned by the state were organized into associations controlled by the state. Socialized medicine is clearly outlined.

Imperial interest in education and in freeing liberal arts professors from public obligations will surprise even some members of the American Association of University Professors. The Code reveals a literate society keeping quantities of records, receipts, written contracts, producing a "boundless multitude of books" (p 487). Today when a college diploma is becoming the *sine qua non* for many occupations and business executives are rediscovering the advantages of a liberal education, it is significant to read in the Code that even a lowly copyist and a fiscal clerk, to hold his job from the year 357 on, must "excel in the practice and training of the liberal studies" and be "so polished in the use of letters that words proceed from him without the offense of imperfections, and it is Our will that all men shall be so informed" (p. 405).

Book VII covers Military Affairs from induction through military clothing, subsistence allowances, the preparing and transportation of food and supplies, quartering, bathing facilities, leaves of absence, deserters, and concludes with elaborate specifications concerning veterans and the Roman equivalents of the G.I. Bill.

No brief review can do more than suggest the vast mine of information and Roman experience that awaits the economist; the sociologist with his interest in marriage, crime, divorce, population, urban and racial problems, all clearly thought out and provided for by the Roman mind; the lawyer; the political scientist; the historian. The *Theodosian Code* and *Novels* reveal a teeming, complex, mature society, a vast "welfare state," and probe unselfconsciously into every cranny of it.

Modern Roman and medieval historians have of course for a long time known the importance of this code. They also knew that it was locked away in obscure and difficult Latin. More than one bright scholar has thought of translating it until he looked into it carefully, and only those who have used portions of the code in the original can fully appreciate the gigantic labors which have kept Professor Pharr and his distinguished associates busy almost to despair for the past twenty years. The present excellent and readable translation fully justifies their efforts and unlocks the huge storehouse of Roman experience and legal wisdom for the benefit of all social scientists.

It is ungracious to criticize such a monumental work, but several weaknesses became apparent as I read through the mass of laws. The notes are too brief and their intricate numberings become confusing. Many laws need more historical explanations to make them fully intelligible. The valuable glossary at the end contains pertinent definitions and a mass of information, but a more extensive use could have been made of the great "paratitla" of Jacobus Gothofredus, the first modern editor of the Code and founder of modern Theodosian scholarship, who labored thirty years upon his six-volume edition in the early seventeenth century, upon whose commentary Gibbon, Mommsen, and Dill leaned so heavily with profit. The present volume is dedicated to Gothofredus, but I wish it had drawn further upon his wisdom. The uninformed reader of this book will wonder how the laws worked No mention is made of the use of the Code by the barbarians in forming their *Leges Barbarorum* and in applying it to Roman citizens, nor of its use during the middle ages.

These shortcomings, however, are trivial in light of the sound, exact, scholarly translation of this great legal code. The book, even though it costs a good deal, is worth any other ten volumes a social scientist could possibly have on his shelves. He should have it where, when any contemporary problem or condition confronts him, he can look quickly by means of the excellent index into the *Theodosian Code* and see what sensible, judicious light the Romans of the late empire throw upon it. He will find it always vigorous, stimulating, even with touches of humor as in the case of laws which attempt to stop property owners from surreptitiously tapping public aqueducts with six-inch pipes. It is a great aid to perspective; and this last is what most of us need badly. Not the least, he will own a beautiful book, the product of the highest standards of modern workmanship.

OSCAR G. DARLINGTON
State University of New York
Champlain College

ECONOMICS AND INDUSTRY

CANOYER, HELEN G., and ROLAND S. VAILE. *Economics of Income and Consumption.* Pp. xvii, 355. New York: The Ronald Press Company, 1951. $4.50

Although not a revision of *Income and Consumption,* portions of this book are based on the authors' earlier book. It was written for two quite different groups of students—those who have had a course in principles of economics, and those who "shy away from the conventional and formal course in principles. . . ." These two groups would seem to include all students. As a consequence the text is not a principles book, in the usual sense, nor is it consumer economics, in the usual sense. The first seven chapters are introductory: a thumbnail sketch of political economy (5 pages); how the economy works (12 pages); definitions (8 pages); standards and planes of consumption (6 pages); specialization (15 pages); exchange, including index numbers, banking, and consumer credit (26 pages); and marketing (16 pages).

"The text then proceeds to its major task of relating economic principles to the many aspects of consumption." Chapters 8–14 include general problems (12 pages); national consumption of food, housing, clothing, recreation (20 pages); personal consumption (18 pages); factors which affect our capacity to consume (14 pages); money income effect on consumption, including causes of inequality (14 pages); effects of habit, health, custom, abilities, attitudes (14 pages); such economic and institutional factors affecting consumption as sales promotion, prices (including 3 pages on the law of demand and elasticity), propensity to save, and leisure (19 pages).

The authors express the hope that chapters 15–20 "will . . . show students how they may govern their *productive* lives more wisely." The contents of this section range from scientific management to comments on the welfare state. Eight pages are alloted to budgeting, six to "wise use of insurance," two and a half to investment, ten to co-operatives, four and a half to labeling, three to advertising, two to testing services, two and a half to Food and Drug Administration, and two and a half to Federal Trade Commission. An average student could complete the text in 10 to 12 assignments.

One must wonder what students who have had principles would find new in these pages, and how much students who "shy away" from principles would learn about governing "their productive lives more wisely."

LELAND J. GORDON
Denison University

NATIONAL BUREAU OF ECONOMIC RESEARCH. *Conference on Business Cycles.* Pp. xii, 433. New York, 1951. $6.00.

This volume contains papers presented at the November 1949 Conference on Business Cycles and some of the comments thereon made by participants

It is clearly a sign of our times that about half the volume deals with econometric approaches to business cycles. In "A Test of an Econometric Model for the United States, 1921–1947," Christ of the Cowles Commission presents a revision of those parts of Klein's sixteen-equation model III that fit postwar experience least well. When the revised model is used to predict an additional year and the results are compared with what actually happened, Klein's experiment does not turn out to be very successful. Klein's criticisms of the paper and Christ's rejoinder make one tend to agree with Friedman's prediction that the National Bureau and the Cowles Commission approaches to investigating business cycles "will become more and more alike." Of particular interest is David McCord Wright's comment that no set of econometric models will ever suffice for reliable long-run economic forecasting: "the element of novel social conception is always breaking in."

In "Studies in Investment Behavior," Klein analyzes patterns of investment (chiefly in the railway industry) during the interwar period. His principal conclusions—that investment during any year was heavily influenced by gross operating profits of the preceding year, that the rate of interest played a smaller role, and that one or more powerful trend variables (perhaps the stock of capital) depressed railroad investment—are critically examined by Angell and Leontief, with a reply by Klein.

C. A. Wright, in "Business Cycle Research and Business Policy," outlines some of the fields of business policy in which business cycle research might help to reduce costs, discusses various forecasting techniques, and presents his own interesting method of forecasting business cycle turning points. Miss Mack's comment, that correct anticipation of turns in business might lead to a new type of technological unemployment, deals with a very remote danger, indeed, though her advice not only to improve techniques of forecasting but also to examine how forecasts are used by businessmen is sound.

A very interesting paper is Haberler's "Business Cycles in a Planned Economy." He argues that, while in a planned economy there would be no business cycles as we know them, planning would not avoid the maladjustments and misdirections of resources which produce depressions in a capitalist economy. The discussion by Bergson, Lowe, Wright, and others is most stimulating.

It is an unfortunate duplication that a relatively large part of the papers have been or will also be printed elsewhere. These include Burns's "Mitchell on What Happens During Business Cycles," Christ's article mentioned above, Hultgren's "Cyclical Diversities in the Fortunes of Industrial Corporations," Abramovitz's "Influence of Inventory on Business Cycles," and presumably Gordon's "Cyclical Experience in the Interwar Period: the Investment Boom of the Twenties." The latter paper examines some of the main factors influencing various components of total investment and lends some tentative and qualified support to the "secular stagnation" thesis.

HANS A. ADLER

Bureau of the Budget
Washington, D. C.

DAVIS, RALPH CURRIER. *The Fundamentals of Top Management.* Pp. xx, 825. New York: Harper & Brothers, 1951. $6 00.

The purpose of this book is to present a fundamental statement of business objectives, policies, and general methods that govern the solution of basic business problems. The author develops and presents a philosophy of management for the purpose of giving maximum assistance to business executives and management educators. It is the author's contention that a sound philosophy of management is necessary for the continuance of the free enterprise system.

Management is treated as the function of executive leadership and an interesting distinction is made between the professional executive and a business mechanic. Functions of the professional executive are discussed as those of planning, organizing, and controlling. Both the management functions and principles are applied to the organic work areas of producing utilities, distributing utilities, and financing the production and distribution processes. The author's treatment of morale and the integration of interests in relation to the line functions of business are important contributions to our concepts in human relations. All this is presented within the framework of line and staff as the two basic forms of organization structure.

In formulating and developing the fundamentals of top management, the author seeks principles and a system of logical thought that can be applied to all executive problems of organization and operation. Within twenty-one tightly packed and closely related chapters the following topics unfold: Basic Management Problems; Standards and Standardization; Business Plans and Planning; Business Objectives and Ethical Standards; Executive Leadership and Management.

In discussing the problems which a professional executive must recognize, analyze, and resolve in operating a successful business, the author establishes as essential the necessities of earning a profit, rendering an economic service, and discharging public responsibility. Attention there is given to business policy; business functions and functionalization; responsibility, authority, decentralization, and accountability; the line organization; staff organization; the attributes of good organization; organizational morale and the integration of interests; operations and the basis of control; preliminary and concurrent control of operations; and business procedure.

In the final chapter on summary and conclusions concerning management, the author recapitulates his philosophy of management. The lazy reader, however, cannot substitute this summary for painstakingly reading the preceding chapters. The book will be widely accepted as a reference book for executives, educators, and students. It may be used as either a reference manual or textbook for advanced management study.

Within the past quarter of a century, there has developed a literature in the field of management and management thought. Collectively this literature has contained the material presented in *The Fundamentals of Top Management*. Professor Davis in this book, his third major contribution, has given to the management field the best and most comprehensive treatment of management philosophy and fundamentals to date.

JOHN F. MEE

University of Indiana

STERN, SIEGFRIED. *The United States in International Banking*. Pp. xiii, 447. New York: Columbia University Press, 1951. $5.25.

The author has performed a distinct service in writing this book. Only a few people will find it of practical use inasmuch as foreign banking is highly concentrated in only a few large institutions; but it contains information which will be found helpful by many others working in the general area of money and banking. Little attempt has been made to analyze monetary theories or to discuss broad economic developments; this is a "factual compendium of notes and sketches on certain interesting phases of American international banking."

The material is based on the author's experience over more than thirty years as head of the foreign departments of various New York banks. It is divided into five parts: a fairly brief historical survey of the development of international banking from 1914 to 1945; a discussion of wartime problems, government corporations, and the role of silver; a detailed account of international banking in different foreign countries; a description of the organization of foreign departments of banks; and a short section on the outlook for international banking after World War II.

This organization occasionally leads to repetition, since material covered in the historical review or in the analysis of specific problems is apt to crop up later in the discussion of individual countries.

This description by countries takes up more than half the volume and is packed with facts—so much so as to make for tedious reading. While it is a good thing, perhaps, to have these facts recorded, the reader will find himself wishing the author had been more discriminating. For example, it is interesting to learn that in Chinese branches of United States banks a native comprador is given such great responsibility that he actually becomes a sort of banker within the bank. On the other hand, the following passage, while suffering from being taken out of context, may nevertheless give an idea of the degree of detail covered:

"Import credits were opened by United States banks to pay for various Mexican crops, such as hennequen, which was grown in Yucatan. Earlier experiences with the financing of sisal hemp back in 1921 had been deeply disappointing for the New York banks involved, but with the Defense Supply Corporation as the buyer the establishment of credits for hennequen and chick peas were transactions devoid of any risk. The hennequen was sold for distribution to United States consumers and fabricators; the peas were payable after inspection on their arrival in freight cars at the American side of the border. Like the Mexican sugar union, the Henequeneros de Yucatan concentrated the sale of their produce in their own hands, using acceptance credits of American banks, secured by the receipts of warehouses in Merida and Progreso in the state of Yucatan."

This is a book for reference, not casual reading.

DAVID P. EASTBURN

The Federal Reserve Bank
Philadelphia, Pennsylvania

SAGE, GEORGE H. *Basing-Point Pricing Systems Under the Federal Antitrust Laws.* Pp. xvii, 381. St. Louis, Mo.: Thomas Law Book Company, 1951. $10.00.

This is an objective, interesting, and useful analysis of basing-point pricing. Its emphasis is legal, and the volume will be of value to practicing attorneys, business managers, and especially to users of industrial products who find themselves disadvantaged and injured by pricing systems.

The study presents fresh, concrete material on the many industries which have used, or are now using, various forms of pricing formulas. Purchasers of a wide range of industrial products are shown to be affected by such systems. Even ultimate consumers have been, or now are, affected in the purchase of such products as corn syrups, corn oils, refined sugar, beer, salt, tire chains, kitchen utensils, galvanized ware, water-mixed paints, crepe paper, paper drinking cups, and cornstarch.

Mr. Sage finds the main explanation for the adoption and use of basing-point systems in the profit-maximizing activities of geographically separate enterprises. A locally separate concern could quote a relatively low mill price and exclude distant rivals from its own "natural-freight rate territory." In competing on price, the locally separate mill could also reduce its mill price to expand its sales area. A distant rival may likewise compete on price to expand its sales area. Thus, Mr. Sage observes, the several geographically separate mills find a common interest in avoiding this marginal price competition by adopting a pricing formula.

From the standpoint of industrial users and final consumers, Mr. Sage states that basing-point pricing means "noncompetitive prices," "arbitrarily high prices," and "identical prices." It deprives purchasers of any choice between sellers on the basis of price. In establishing high local prices, a mill also discriminates against purchasers in its own "pricing territory."

Following each analysis of the various kinds of basing-point pricing, Mr. Sage gives a summary statement of the legal status of the particular pricing formula. Federal legislation which may be applied to basing-point practices consists of: (1) the Sherman Act, (2) the Federal Trade Commission Act, (3) the Wilson Tariff Act, and (4) the Robinson-Patman Act.

In reading Mr. Sage's analysis one is impressed with the clarity and certainty of the law ***against*** basing-point pricing. Basing-point practitioners urging that new legislation be enacted *to clarify* the law should read this book. The fact is that basing-point industries do not like the existing law and its interpretation. They want it changed so that they can continue their monopolistic ways.

Mr. Sage presents no special remedy for the basing-point practice, except the implied one of an enforcement of the law. Section 4 of the Clayton Act provides that any person injured in his business or property by a violation of the federal antitrust laws may sue for treble damages. Since winning its land-mark decisions against basing-point pricing (1945–1948), the Federal Trade Commission has done little more than to call upon other industries to comply. Perhaps persons injured by basing-point pricing can make a contribution to law enforcement by bringing actions for treble damages. The immediate problem of enforcement, however, waits upon action by Congress. If proposed legislation to amend the Robinson-Patman Act is adopted, it is probable that industrial users and consumers will be largely helpless

against the stone wall of identical delivered prices. VERNON A. MUND
University of Washington

SOCIOLOGY AND EDUCATION

PARSONS, TALCOTT, and EDWARD A. SHILS (Eds.). *Toward a General Theory of Action.* Pp. xi, 506. Cambridge, Mass.: Harvard University Press, 1951. $7.50.

Despite the authors' masterly analytical skills and despite their heroic pertinacity, this collaborative treatise by sociologists and psychologists, entering boldly upon a terrain where philosophers have made some magnificent but forgotten explorations, has deeply stirred but not persuaded this reader. Students of Freud, Durkheim, and Weber in general behavior psychology will easily verify the editors' modest assertion that any originality in their theory must be found solely in their formal conceptualization of certain presumed "outcomes" of "twentieth century" social science. In any appreciation of the proposed theory given this presumption, everything must depend upon the characteristics of the formalization and upon the fruitfulness of this formalization for inquiry.

A steady stream of overly-general and too unqualifiedly logical-positivist comment on the relation of theory to experience does indeed run through the volume. None of the comments, however, evinces any awareness of the differences which Windleband, Rickert, and Weber carefully pointed out between their type of "model" and that of the mathematical-natural sciences, or, for that matter, of the lacunae in logical-positivist theory concerning the ideal basis of decisions connecting logical calculi with nature and society. Not one step is taken in the entire volume toward the design of confirming experiments or answering inquiries concerning the general theory of Parsons and Shils, with the exception of Stouffer's paper, a paper of marked intrinsic statistical interest but quite obviously separable in technique from the general theory of Parsons and Shils.

There are, nevertheless, excellent things in the papers surrounding, if not exemplifying, the basic theory. Murray's paper is sweetened with classic humanistic wisdom: a breath of Emerson in a sociological desert. Kluckhohn dissects Lundberg neatly, and opens a definite, if somewhat hesitant, attack upon the excesses of cultural relativism. Tolman carefully and honestly maps the terra incognita between animal and human psychology. Allport shows a sensitivity to the dimensions of prejudice not often found in the optimistic literature Much more could be added in acknowledgment of the merit of the papers surrounding the basic theory, if space allowed.

Waiving all questions of applicability and illustration, we now ask, is there anything dubious or incomplete at the logical heart of the basic theory as such? The root-idea of Parsons and Shils is the thesis that there are precisely five inevitable dilemmas or five kinds of selective choice in all action (pp. 80 ff). Every selective choice, it is maintained, is necessarily involved in "costs," for costs must be assessed whenever any possible goals, gratifications, or objects are excluded from a selective choice as "physically" or "logically" incompatible with those that are actually chosen. Only praise can be offered to the editors for the brilliant virtuosity with which they trace the impact of their five dilemmas through the dimensions and types of personality, society, and culture. The sobriety and integrity of Parsons' and Shils's exposition of the inevitable costs under any circumstances of maintaining the mutually irreducible systems of personality, society, and culture in required interaction will serve well in counteracting the naive optimism of "social engineers," utopian Marxists, anthropologizing romantics, and others. But it is all rather grim, too grim to be a pure logical deduction. The editor's assertion that their dilemmas are by *definition* (p. 91) exhaustive and inevitable is simply powerless to legislate for the facts. This reviewer believes, on the contrary, that every achievement of mature culture could be shown to be a transcendence of their dilemmas; for example, "asceticism" can invigorate "immediate satisfaction"; granting universal rights can increase the supply of friends; equity can be incorporated into law; what people could do is by reasonable love known to be part of their character, and so forth.

So far as this reader can discern, the authors' confidence concerning the messy costs of all possible action is really sustained, not by logic, but by three enormous presumptions concerning matters of fact and experiment. Briefly stated these presumptions appear to be the following: (1) contradictions cannot be removed in time and duration by a respecification and reconstruction of what they "inhere" in (a good antidote to this presumption can be found in Bradley's essay on contradiction and contrary in his "Essays on Truth and Reality"); (2) the scientific control of materials and events cannot diminish "scarcity" to that range within which human choice would no longer be essentially economic; and (3) maximized moral value is some basically additive summed aggregate of primitive need-dispositions. These are not analytical truths, but positivist and psychoanalytical superstitions wedded to a derivative Kantianism which has lost contact with experimental science.

We should, if this were the occasion, propose to the authors of the present theory of action an alternative leading idea in proper postulational form that conflict between "alternatives" can be diminished without limit. The postulates of such a view might enable one really to find a difference between spurious and genuine culture. Such at least, we believe, was the impression of Leibniz as he surveyed the pluralities of action systems; it is not likely that the authors or any critics of this essay could rival him either in analytical or combinatorial power or in serenity. Man and his works are, it is a comforting thought, perhaps better than we pretend.

HENRY A. FINCH

Pennsylvania State College

FESTINGER, LEON, and HAROLD H. KELLEY. *Changing Attitudes Through Social Contract: An Experimental Study of a Housing Project.* Pp. 83. Ann Arbor: Research Center for Group Dynamics, University of Michigan, 1951. $1.50.

While the Center for Group Dynamics was still at M.I.T., this research was undertaken to contribute to our knowledge of attitudinal change. The subjects of the project were a sample of the adult inhabitants of a hundred-dwelling federal housing project, erected in 1942 to provide houses for shipyard workers adjoining "Baytown," which had a population of 30,000 and was one of the oldest towns in the country. The study was made in 1947, when only 40 per cent of the original project dwellers were still in residence and when only 12 per cent of the project members still were employed in the shipyards. The inhabitants saw their neighbors not only as low-status people but also thought the townspeople looked down on their project neighbors as inferior. The resulting hostility expressed itself not only in poor project-community morale, but also in poor intergroup relations between the project and the surrounding town. To change this situation of hostility, the study was projected. "The persistence of these attitudes in the face of evidence to the contrary seemed to be explained by the scarcity of social contacts occurring within the project and between the project and the surrounding community." To test the hypothesis implicit in this observation a research team, consisting not only of researchers, but also of community workers, came to Baytown and for a period of nine months carried on the action research described in the report.

After making an initial survey of the status-related attitudes of a sampling of project and town inhabitants, the action wing of the research team went to work and helped organize several community programs in the housing project: a nursery school, a program for school-age children (9 to 12), a teen-age project, some adult group activities (men's softball teams and adult evening craft sessions), and finally during the last period of the research program an advisory committee for community problems.

The research findings were based on data collected during the action program, from records kept by the community workers which described the day to day developments of the program and data on contacts, friendships, and attitudes observed by these workers, and from four surveys which marked the more formal program of evaluation to determine the kind and amount of change occurring during the development of the program. These surveys were taken at intervals of two or three months and covered not only the people in the project but also a random sample of town residents.

Interpreting their findings, the authors offer for further consideration the following communication theory of attitudinal change:

1. "Contacts are effective in producing attitude change only if they entail the transmission of social attitudes, i.e., evaluative statements by other persons about the objects of the attitude." These "evaluative statements" need not be verbal, but may be evidenced in other modes of behavior.

2. "The effectiveness of a communicated attitude in producing change is a function of various aspects of the relationships between the communicator and recipient, e.g., their interpersonal attractions, power relationships, etc." That is to say, if people engage in a project of common concern and in the course of their contacts carry on communication about attitudes and opinions on which they differ, the conditions for attitude change are present.

3. "Contacts will not be effective in producing attitude change if they merely contain information about the objects of the attitude."

MARTIN P. CHWOROWSKY
University of Pennsylvania

SOROKIN, PITIRIM A. *S.O.S. The Meaning of Our Crisis.* Pp. xi, 177. Boston: The Beacon Press, 1951. $2.50.

This is one more book in the succession of publications in which Sorokin endeavors to popularize the findings of his "Social and Cultural Dynamics." Here he deals with three phases of the crisis of the last decade: the "murderous trend" it exhibits, and polarization and totalitarianism which accompany this trend.

Evidence of the "murderous trend" is presented in the first three chapters According to Sorokin, "the Great Destroyer" is at large and He is incarnated in the ruling groups and in their scientific and legal advisers, for these groups have "the highest rate of the most brutal, greedy, selfish, sensual and cynical individuals" (p. 13). In presenting the case against these individuals Sorokin adopts a novel style. He makes a devastating indictment of everything that is being done today in all fields of endeavor, from politics to science and art, in the form of a supplication from "the Little Mortals to the Big Immortals." It contains the fanciest appellations ever to appear on a printed page. Social scientists will be interested to know that they are, among other things, "Learned Weavers of Words into Meaningless Carpets," "Testophrenics," and "Psychosocial Technomaniacs," and that they study the basic problems of the social and humanistic sciences "with the marvelous techniques of anti-mathematical statistics, anti-logical semantics, anti-observational psychoanalysis, anti-rational operationalism, and by the techniques of the thoughtlessly nondirective interviewing, of the open-and-closed interrogation, of the guided-in-unguided questionnaires of the clinical psychologists, sociologists and anthropologists" (p. 45). In sum, ye "Scholarly Vibrators of Air Waves and Processers of Paper" serve the Great Destroyer "as the ideological parasites of the bloodsucking parasites of humanity" by "confusing our minds and consciences" (p. 49). However, the presently rampant Rule of Perversity is not going to last. Eventually the "re-enthronement of the soul" will shatter the hypnotic power of our present lords and their scientific experts.

The vituperative effusions and exaggerations are not carried into the other chapters of the book. In these Sorokin, with relative calm and in his familiar eclectic manner, discusses polarization and totalitarianism. He sets forth two "laws." The first is "that a crisis, calamity, or frustration tends to make explicit and open the implicit and hidden contradictions, whether in one's mind and conduct, or in a social group and institution, or in a given culture" (p. 100). This he calls the law of polarization. To contradict the effect of this law a reintegration of our culture "along integralist lines" should be instituted.

The second law asserts that "as soon as any important emergency or calamity occurs in a given society, the control and regimentation of its government begins to expand and grow; as soon as the emergency subsides, the government control declines" (p. 144). After a somewhat sketchy inductive verification of this proposition, Sorokin draws the general conclusion that "the medicine against Communism and totalitarianism is neither war, nor rearmament, nor threats, nor propaganda of hate, but peace, and lack of emergency" (p. 169).

The least that can be said by way of criticism of this book is that it shares the fundamental weakness of most other books that deal with the present crisis. It stresses what ***should*** be, but fails to indicate ***how*** this can be accomplished.

THEODORE ABEL

Hunter College

HEBERLE, RUDOLF. *Social Movements: An Introduction to Political Sociology.* Pp. xiii, 478. New York: Appleton-Century-Crofts, 1951. $4.00.

Political sociology, the subject of this book, is, it appears, the study of how men act to accomplish political or social ends whether those ends are reconcilable with prevailing community values or not. As it happens, in the disturbed world we inhabit, as much of the material presented and analyzed in this book deals with movements whose ends are realizable only outside the established community—with fascism and communism—as with "normal" political affairs.

Professor Heberle's techniques of analysis represent chiefly a synthesis of pre-Hitler German and American approaches, with side glances at French and British ideas. As he employs them, they produce results which are, generally speaking, illuminating; and they are so clearly explained that they can readily be taken over and applied by others In this sense the volume is a most successful textbook.

There is, of course, no requirement on textbooks that they be novel in the ideas they convey. This reviewer is far from being a specialist in political sociology, or politics, or sociology. Nevertheless he was forcibly struck that most of the ideas and interpretations offered by Professor Heberle have somehow gained a wide circulation. They seem to have reached numerous persons who, for one reason or another, have had to concern themselves with the whys and hows of politics today. This, then. is not a book to search for unusual insights but rather should be viewed as a valuable epitome of current thought, systematically organized for pedagogical purposes.

However the field is sliced, American politics still comes out ***sui generis.*** On Professor Heberle's showing we can contract most of the political and social diseases going at any time and yet somehow throw them off before they do irreparable damage. Other nations are not so fortunate. Is this attributable to the formal organization of American politics, which is loose and often pleasantly illogical, or is it attributable to the fact that, all pessimism to the contrary, we possess one of the most soundly viable societies in the world today, so that our community values still outweigh any alternatives thus far propagated? Or are both factors operative? And which is the more important? An essay by Professor Heberle along these lines would make very interesting reading.

C. HARTLEY GRATTAN

Katonah, New York

HANDLIN, OSCAR. *The Uprooted: The Epic Story of the Great Migrations That Made the American People.* Pp. 310. Boston: Little, Brown and Company, 1951. $4.00.

Since all Americans are immigrants or the descendants of immigrants, it is not strange that the vast influx of new peoples into the United States in the nineteenth century has been the focus of much attention. Marcus Hansen and Carl Wittke have enriched our understanding of the role of immigration in American life and culture. The present book, different in content as well as in style, seems worthy of rank beside the works of those two scholars.

Others have written of "the impact of

the immigrant upon the society which received him, of the effect upon political, social and economic institutions" of the more than thirty millions of newcomers in the century after 1820. Dr. Handlin, taking an opposite point of view, is concerned with what immigration did to the immigrants and with the extent to which "their reactions . . . may throw light on the problems of all those whom the modern world somehow uproots."

In his opening chapter, Professor Handlin goes back to the European roots of the great migrations—to the European village with its age-old customs and security, to the peasant family, a tightly-knit social, economic, and cultural unit. In dramatic, moving prose he discusses the changes and problems that beset the peasant villagers Finally, after the land enclosures, they began to seek, in ever increasing numbers, the New World of Promise.

Seldom in our historical literature have we been offered such detailed, realistic pictures of what it meant to come to the New World. The crossing itself, the struggle to make a living in the New World, the problems of housing, social fellowship, religion, adjustment to democracy—a chapter is devoted to each of these. The social and political pressures, the friction and misunderstanding between generations, the awful realization that the adjustment was too great—this reviewer knows of no book that captures these moods and situations with such sympathy and understanding. In an epilogue titled "Promise," an imaginary and unspoken conversation between an immigrant father and his son, the author probes for the spiritual and moral meanings of the great epic movement.

This is not, in either style or format, conventional or scholarly history. There is no bibliography, index, or footnotes; quotations are paraphrased. The style is not pedantic or heavy. The author is imaginative, sensitive, understanding. A tremendous amount of research and real depth of understanding lies behind the book. Laymen will enjoy this book; specialists will find it provocative and will admire the style and synthesis. This is literary history in the tradition of Parkman, Prescott, and Motley. It should be widely read.

RALPH ADAMS BROWN
State University of New York
at Cortland

BUELL, BRADLEY, and associates. *Community Planning for Human Services.* Pp. xiv, 464. New York: Columbia University Press, 1952. $5.50.

This book resulted from a joint undertaking by Community Research Associates, consultants from the principal fields covered, and many others who contributed particular knowledge. The purpose, as explained in the preface, was to create the framework of a coherent program of community well-being.

Much of it is based upon the St. Paul, Minnesota, project which revealed clear and precise data on a family-to-family basis as well as a community-wide picture of the incidence and interrelationships of basic human problems. This study showed that serious problems of dependency, ill health, and maladjustment tend to cluster in the same family groups, with 6 per cent of the community's families receiving over 50 per cent of the health and welfare services in the city.

The framework of the book consists of separate sections, the four human problems of dependency, ill health, maladjustment, and recreational needs In each, the problems, service functions, and systems are discussed. Not surprisingly these are uneven in treatment. In spite of the provocative nature of the book as a whole, there are certain inaccuracies, conclusions that seem unwarranted by the findings, and points of view that may be questioned.

In the section on dependency, the statements regarding social insurance are misleading. Much is said about conflicting objectives and the cost of insurance. No clear picture is presented of social insurance as a protection against the common hazards of life such as old age, death of the bread winner, unemployment, sickness, and disability, nor of insurance as a way of preventing dependency.

The section on ill health seems to reflect the thinking of the American Medical Association with no recognition of the views of the Physicians Forum. Fear is expressed that health insurance would give the consumer an official voice in respect to problems governing the practice of medicine! The conclusion is reached (p. 234) that we must choose between "community-wide organization of a purposeful program to prevent, control and reduce disease" and "the expansion of medical services to assure their distribution to individuals who have hitherto been unable to avail themselves of these services." Why?

In the section on "Maladjustment," the term is used to cover a composite of behavior disorders and socially unacceptable conduct. The discussion on community acceptance of responsibility, particularly pages 246–251, seems to be unusually good. The lack of federal leadership in the maladjustment agencies for corrections, mental health, and case work may be significant. Comparison may well be made with the areas previously discussed where major gains have been made in the reduction of need and in lower death rates.

The "Recreation" section points up the need to develop criteria "by which to judge quality of performance in the recreational field or to allocate labor and responsibility among the community agencies." The need for more facts and for a survey of the current use of recreational agencies is stressed. Good suggestions for further research and planning are included. There seems to be some lack of information about the current developments of social group work and the functions of the social group worker.

The authors conclude that a new functional design for the total community would help to prevent and reduce the consequences of these many interrelated problems. The team approach by the different professional groups is required for this.

The book is interesting, stimulating, and thought-provoking largely because it approaches these complex problems of human trouble from the perspective of the local community. The final chapter in the book on the significance of the findings for community-wide planning is an excellent statement.

MARIETTA STEVENSON

University of Illinois

SMITH, T. LYNN, and C. A. MCMAHAN. *The Sociology of Urban Life.* A textbook with readings. Pp. xiii, 831. New York: The Dryden Press, 1951. $5.50.

Systematic treatises on urban sociology like those written during the twenties and thirties seem to be in process of disappearing in favor of collections of papers on special topics, for which the semidemographic term, "urban sociology," may serve as an organizing principle. This shift in emphasis may reflect the shift from an older macrocosmic to a newer microcosmic sociology of interpersonal relations.

The authors of this volume have prepared a pedagogically sound textbook, inasmuch as the divisions into eight parts and 25 chapters are preceded by brief and often perceptive introductions serving to orient beginning students not only to urban sociology but to sociology in general to the extent the readings which have been selected permit this to be done. Selected problems and projects and lists of suggested and of supplementary readings follow each chapter. Many will feel that a content and an organization of this kind are preferable to the treatises by a single author and specialist in his particular field of sociology.

The book must be critized on at least two counts. There are some 68 readings or essays in the volume. Of these 32 could be identified as having been published before 1940. These include 5 selections from *Our Cities,* issued in 1937 by the now defunct National Resources Committee. Included also are 5 selections from the pre-1930 works of Sorokin and Zimmerman. The sociologists Burgess, MacKenzie, Park, Albion, Small, Cooley, Mowrer, and Ogburn are represented by one paper each (two for R. E. Park), and none of these essays are dated later than 1933. Of the total of 68 readings it is possible to identify at least 27 written by nonsociologists or prepared by government agencies. Eleven of the readings were either prepared especially for this volume or were taken from previously unpublished manuscripts. These 11 were written by four authors, all teaching in southern land-grant colleges, of whom at least two have earned distinguished records as rural sociologists. Indeed, at least 4 of these readings in urban sociology are condensed versions of bulletins of Agricultural Experiment Stations, and as such may not provide meaningful insights into the nature of modern American urban culture. Finally, at least 10 of the readings reprinted in this book are excerpts from five readily available sociology textbooks, all published in new or revised editions since 1947.

A more serious objection to *The Sociology of Urban Life* is the exceptionally strong emphasis upon an older formalistic sociology in which institutions and demographic aggregates are the chief objects of study, rather than the social dynamics of interpersonal relationishps. Largely missing are references to the anthropologists' studies of the urban culture of contemporary America, to the structure and function of ethnic groups, and to collective behavior and its phenomena. The readings on ecology do not adequately represent either the past or the current research in this field. Social structure becomes social morphology; the scientific method is the traditionalist "science" of mechanistic positivism, and the social processes are the orthodox assimilation, accommodation, acculturation, conflict, co-operation, competition. Of social process, forerunner of interactionist and situational sociology, the authors say (p. 587): "Social processes are much more difficult to analyze than the morphological and institutional aspects of society. For this reason, no doubt, this part of sociology is not very highly developed." It certainly is not very highly developed in this book.

MYRON F. LEWIS

Washington, D. C.

DUBLIN, LOUIS I, in collaboration with MORTIMER SPIEGELMAN. *The Facts of Life—From Birth to Death.* Pp. x, 461. New York: The Macmillan Company, 1951. $4.95.

In his preface, Dr. Dublin writes that this book has been suggested by a great number of inquiries from all sorts of people, which inquiries have poured into the Metropolitan Life Insurance Company as a result of the company's wide circulation of pamphlets and of the *Statistical Bulletin.* In spite of this explanation, one wonders what the purpose of the book really is. It is not an encyclopedia in the usual sense. It is a set of twenty-five chapters beginning with "Who We Are—The Population" and ending with "The Effects of War." The chapters consist exclusively of questions and answers, totaling about 1,100, with some cross-referenced duplications. The questions range in number per chapter from 38 ("The Conquest of Tuberculosis," VIII, and "Suicide and Homicide," XVII) to 56 ("The Accident Toll," XVI).

Without question, the book is informative, but in an irritating way. The book is written almost completely in a dogmatic style as one would write for children. For example, on page 243: "Are more males than females killed in accidents? . . . The adventuresome male has more than twice the chances of the female of being killed by accident . . ." is followed by a discussion of data for 1946 and a sex-ratio chart. Where was this information obtained? Presumably the reader should be satisfied that Dr. Dublin has put down the right figures, that he knew that the use of 1946 data could be taken as typical with respect to relative frequency among types of accidents and distribution by sex within types of accidents. If one wanted to look further, he could turn to the bibliography on Chapter XVI on p. 431, but he would find there no reference to Vital Statistics in the United States, which this reviewer assumes to be the source of the data. Only the informed could find that reference on page 426 under "General Reports." Most people would not be able to track these things down, and they would therefore have to cite Dr. Dublin as the original source Worse still, in many instances, the answers come from "one survey," and the only way to find out what that was would be to send further inquiries to Dr. Dublin.

There is an extensive index, and the questions are well set off. It would take a battery of experts to determine whether the answers represent the best current knowledge. In those few fields where this reviewer has had some experience, no major exceptions could be taken, and most of the important points were covered. It is almost impossible to criticize omissions because one does not know how to begin. It may be unfair, for example, to suggest something on the recent important work on ovulation time in a book that claims to start its facts from birth. I would like to have seen some reference to the extensive current data being collected by the Health Insurance Plan of Greater New York; and the use of Selective Service data seemed skimpy. These, however, are random thoughts. The main point is that an alternative procedure of issuing something more like an annotated *World Almanac*, where one does find sources cited, would be much more useful to people with real intellectual curiosity in this general field.

E. DOUGLASS BURDICK

The University of Pennsylvania

ERNST, MORRIS L., and DAVID LOTH. *For Better or Worse: A New Approach to Marriage and Divorce.* Pp. 245. New York: Harper & Brothers, 1951. $3.00.

"In the last ten years eight million Americans have walked out of court with a divorce decree, to face . . . what?" is the opening sentence of this popular book for the man on the street and his unhappy wife or ex-wife. The authors proceed to outline the various problems that divorced people face in a series of chapters entitled: Loneliness; Frustration; Sex; Money; Children; Jealousy.

Much of the content of the book is in the form of verbatim excerpts taken apparently from personal responses to questions sent by the authors to men and women divorced at some time previously. There is no statement of the number of respondents, or the length of time since their divorces. As the authors put it, ". . . the men and women who collaborated with us do not constitute a survey. This is not a poll. There is a wide variety of representation, geographical, economic, occupational, age and so on. But these cases are not a sample that can be said to give an accurate or complete cross section of our divorced population. They are simply people who have been divorced" (p. 21).

The treatment of other's work in the field is quite as casual, "Aside from a few magazine articles, a few sociological studies, a novel or two, there is no literature to tell them what the world of divorce has in store for them" (p. 1). Although the subtitle announces this as "A New Approach to Marriage and Divorce," there is no reference to the relevant work of the Interprofessional Commission on Marriage and Divorce Laws; the American Bar Association; the report and recommendations of the Legal Section of the National Conference on Family Life; Divorcees Anonymous; the American Association of Marriage Counselors; the National Committee on Marriage Counseling and the National Committee on Marriage and Family Law, both of the National Council on Family Relations; the marriage counseling that is an inherent part of such courts as those of Judge Alexander of Toledo or of Judge Anna Kross of New York; nor is there mention of the recent studies of William Goode (popularly presented in a series of articles in *The Saturday Evening Post*), or Harvey Locke's *Predicting Adjustment in Marriage: A Comparison of a Divorced and a Happily Married Group* (Henry Holt, 1951).

Chapter X, "Remedies," recommends five points for state concern in the childless divorce:

"1. That the action is not hasty or hysterical.

"2. That the couple have had help in trying to make their marriage work.

"3. That the marriage has every chance to heal itself while divorce is under consideration.

"4. That the wife has not accepted a monetary settlement under duress or through ignorance of her rights, especially if she is untrained for self-support.

"5. That the wife is not pregnant" (pp. 216–217).

For the couple with children, the authors recommend a period of delay and study under the guidance of a competent counselor to protect fully the interests of the children as well as to safeguard the values of the family.

As is usual with books of this kind, there is no index, no list of parallel readings, no documentation, and no listing of sources of further help. Within these limits, the book is a contribution to the field and to the men and women for whom it is intended.

EVELYN MILLIS DUVALL
Chicago, Illinois

LUZBETAK, LOUIS J. *Marriage and the Family in Caucasia: A Contribution to the Study of North Caucasian Ethnology and Customary Law.* Vol. 3 in "Studia Instituti Anthropos." Pp. xvi, 272. Vienna-Mödling: St. Gabriel's Mission Press, 1951. No price.

This is an ethnographic study based largely on written sources, most of it from rare periodicals and adat collections, and belongs to the so-called Jesuit school of diffusion associated with the name of Wilhelm Schmidt of the Universities of Fribourg and Vienna. The author does not use Soviet sources and is critical of czarist studies but finds them nevertheless often the best available. A bibliography of 635 pre-Soviet items in Czech, Arabic, Russian, Caucasian, and other inaccessible languages, as well as in English, is appended in addition to an ethnographic and linguistic map of the Caucasus.

The emphasis is juridical, the aim being "to trace the history of North Caucasian marriage and family law from the present to prehistorical times." Russian (Soviet and pre-Soviet), Islamic, Christian, Avesta, Armenian, Byzantine, and Roman unifying influences are illustrated concretely and located geographically, and then, figuratively speaking, peeled off. The residual core of marriage and family customary law is taken to constitute "a more or less pure adat-law." Despite the fact that there are no pastoral nomads in the Caucasus the type of marriage and family embodied in the adat law as revealed under the layers of later influence is typically pastoral nomadic, although in varying degrees among the different tribes. The author explains this pastoral nomadic character of the adat law in terms of prehistoric finds which show that this area was the home of a highly developed pastoral nomadic civilization and that it continued to feel the impact of other cultures of this type. "This constant contact with nomadic societies perhaps from the very beginning of pastoral nomadism—certainly since the Scythian period almost 3,000 years ago—throws light upon the intricate problem: Why, how and when did the North Caucasian marriage and family customary laws become so pastoral nomadic?" (196). The author concludes that "a connection between the North Caucasian society and that of Inner Asia is beyond question" (199). Future research will have to determine the nature of marriage and family law before the impact of pastoral nomadism.

This is doubtless an excellent study of the old-fashioned type; it is interesting, but it does not, as more modern studies do, attempt to get at the meaning of social forms to the people who practice them. A good many recent American studies go to the opposite extreme. Is there not a happy medium?

JESSIE BERNARD
The Pennsylvania State College

DONAHUE, WILMA, and CLARK TIBBITTS (Eds.). *Growing in the Older Years.* With a foreword by Everett J. Soop. Pp. 204. Ann Arbor: University of Michigan Press, 1951. $2.50.

Growing in the Older Years is the last of a trilogy about the problems of our aging population. Like its predecessors, *Living Through the Older Years* and *Planning the Older Years,* it is a collection of intelligent and thought-provoking essays providing up-to-date information for the practitioner and student of gerontology as well as for those concerned with their own aging processes. This book is planned around three subjects: (1) medical health; (2) mental hygiene; and (3) education It is pleasant to find that all the contributors have the knack of talking intelligibly and interestingly about their special topics.

The four doctors (J. W. Mountin, W. B. Kountz, N. D. Leyda, and M. M. Dacso) who discuss problems of medical services do a comprehensive job in limited space. They consider the kind of community health organization needed to make the best use of existing knowledge; methods of controlling degenerative diseases; the role of the industrial physician; and the techniques of physical restoration. They display a hopeful and constructive approach to the prevention of physical disability in old age and to the restoration of those already disabled.

A similar positive note is struck in the three chapters on mental health. Robert Felix classifies the processes of aging as physical, mental, social, and economic, then proceeds to analyze the supportive factors in personal and community life that contribute to the maintenance of mental health in old age. Moses Frohlich provocatively concerns himself with the changes in emotional needs with aging, specifically with changes in the need for power, changes in the body concept, in aggressive behavior, in social needs, and in erotic strivings. Jack Weinberg discusses recent trends in psychiatric treatment for older people, again emphasizing the new appreciation of the possibilities of psychological rehabilitation.

In all seven chapters we see again and again the recognition of the interrelationship between environmental and personal factors as we age.

The section on education (by Thomas Van Sant, Everett Soop, Ollie Randall, and Roger Heyns) highlights four important topics. Van Sant points to the need for education of the total community about aging and underscores areas of ignorance as well as indicating desirable development of goals and programming. Soop elaborates this theme in reviewing current and proposed educational efforts. In a slightly different vein, Ollie Randall contributes a well-rounded essay on the training of volunteers for older people's programs, and Heyns supplies a basic discussion of the use of groups.

Two more general papers that begin and end this book are written by Clark Tibbitts and Wilma Donahue, the two people who were primarily responsible for all three volumes. They are to be congratulated upon the substantial educational task so successfully undertaken in this trilogy.

ELIZABETH BRECKINRIDGE

Illinois Department of Public Welfare
Chicago, Illinois

REDL, FRITZ, and DAVID WINEMAN. *Children Who Hate: The Disorganization and Breakdown of Behavior Controls.* Pp. 253. Glencoe, Ill.: The Free Press, 1951. $3.50.

A bold attempt was made by the authors to experiment with a number of children who exhibited the most serious characteristics of aggressiveness and misbehavior, and to learn what actually produced delinquents. The investigation was distinctly a research project, but the writers preferred the use of the word "exploration."

The appeal of the book is largely to the professional worker or student and makes difficult reading for the ordinary layman. However, from the stratosphere of psychiatric terminology, it comes to earth with such words as "leery," "hog-wild," and extracts from case histories that accurately reveal the boys' delinquent egos but induce painful hysteria in the ostrich-minded book censor.

The project consisted of the establishment and operation over a period of nineteen months of a "group therapy home" known as "Pioneer House." Of the ten children admitted only five constituted the stable population that remained until the close of the study. In order that the control system of a child might be better understood, the factors involved in the causes of his psychological trauma were studied before each boy's admission.

The observation in the "Home" revealed more than twenty types of breakdown of control some of which are described under such terms as: "situational lure," "gadgetorial seduction," "newness panic," and "exposure to competitive challenges." The traditional descriptions of ego functions in terms of basic attitudes toward reality are recognized as inadequate.. Furthermore professional psychiatry provides no satisfactory remedy since the ego must be followed into the scene of daily behavior control. The authors recognize delinquency in terms of its legal and cultural connotation but contend that the clinical concept of delinquency has great relevancy. For example, it can well differentiate between the personality disturbances in the case of two boys who might have committed exactly the same type of offense.

In Chapter IV the numerous techniques of the delinquent ego are enumerated and described. The tyranny of the "group code" is very important and also of great interest to the sociologist. The purpose in presenting various defenses is to show how the aggressive ego tries to excuse itself both in respect to the world and to the individual conscience.

The writers note that the well-known defense mechanisms of current usage are inadequate, and therefore they present techniques that aim to deal with the aggressive ego so as to provide a gradual reduction of ego tensions as well as the elimination of various aspects of impulsivity.

The book closes with the statement that the "details of a total strategy for ego support will be offered by the authors in their forthcoming publication." This leaves the reader at the cross roads not knowing which way to go. Nevertheless the book will be most useful for professional workers with children, and the supplementary volume should be awaited with eager anticipation.

GEORGE B. MANGOLD
University of Southern California

PIERSON, DONALD, with the assistance of LEVI CRUZ, MIRTES BRANDÃO LOPES, HELEN BATCHELOR PIERSON, CARLOS BORGES TEIXEIRA, and others. *Cruz das Almas: A Brazilian Village.* Pp. viii, 226, 20 plates. Washington: Smithsonian Institution (Institute of Social Anthropology Publication No. 12), 1951. $1.50.

Cruz das Almas, in the state of São Paulo, includes some 2,700 village dwellers and inhabitants of the surrounding area. This population is composed of relatively isolated, nonliterate (or only partially literate) descendants of assimilated Indians. Miscegenation, which began with the arrival of the Portuguese, continued until the indigenous peoples, as a distinct physical type, disappeared. Since amalgamation continued when Africans were brought in, there are few places in the world where the fusion of racial groups has been as continuous and on as extensive a scale. The society is characterized by a high degree of social solidarity, primary relations, and a minimum of social change and social disorganization. The culture is largely a folk culture; personalities are relatively well integrated.

Racial categories have no place in the vital statistics of the community; instead, the color categories of white, black, and intermediate are found. These sociological categories reflect what the local residents consider the terms to mean. A registrar lists a person as white if he looks more like a white than a black, but his reaction varies with degree of friendship and with his current mood. An expected pattern of behavior throughout the community is that of "grading-up." It is bad form not to refer to a black, especially in his presence, as if he were an intermediate and to an intermediate as if he were white. According to the village registrar, no black was born in the district in the period 1931–47, but the authors state that at least twenty-seven persons in this age group appear to be of relatively unmixed African origin. The authors are somewhat inconsistent in their appraisal of color as a prestige factor. On page 190 they state that "prestige definitely attaches to white color," but on page 200 they say that ". . . status is little, if at all, determined by race or color." In any event, in daily association little attention is given to either racial or color variations. Persons of color eat at the white's table, and there is no discrimination in voting, in employment, or at Sunday Masses. People of all colors drink together, play cards together, dance together, hunt together. There are a considerable number of intermarriages, although those involving the opposite ends of the color scale are less common, and there is a tendency to marry a person who is as light as possible.

The family type is patriarchal and the family groups are closely knit. Woman's place is very much in the home, and her inferior status is seen in the authority her husband exercises over her, her lack of participation in politics except to vote as instructed by her husband, and her limited mobility and recreations. Nevertheless, as in many peasant societies, a wife may exert effective control over her husband.

Catholic Masses and prayer services are well attended in Cruz das Almas, but the number who confess and receive Communion is relatively small. Vows to saints at times of personal crisis and pilgrimages to a shrine some distance away are parts of the Catholicism complex in this area. Although their followings are small, a number of recently formed Protestant sects have occasioned some conflict.

Interesting examples of sympathetic magic include subjecting the image of a saint to such indignities as hanging it by the neck in a well, holding it over a fire, or putting it into a mortar and smashing it.

The term "acculturation" does not appear in this volume. Of the five references to "vestiges" of African culture, two are brief and general, two pertain to language, and one concerns the possibility that the present attitude toward illegitimacy "reflects imported Portuguese mores, re-enforced by African and Indian cultural heritages, together with the circumstances of colonial settlement in Brazil." In addition to two general references to "vestiges" of Indian culture, the following specific items are touched upon: Indian words which have become a part of the country man's speech, the restlessness of landless individuals as a possible survival of earlier seminomadicism, the continued importance of the hunt despite the fact that today the basic means of subsistence in this country is agriculture, and the care given to keeping the *terreiro* (space around the house) cleared of vegetation. According to the authors, the assimilation of Indians and Africans has been so effective that "until today the most diligent and persistent research is able to turn up only a few vestiges of either group of cultures." The reviewer suggests that such beliefs as those concerning (a) the crossroads as an evil place (page 169) and (b) the ability of the souls of the dead to return and harm the living (page 168) may be African retentions. One wonders whether an Africanist would discover other Africanisms in Cruz das Almas.

This is a competently executed and interesting community study in which the emphasis is put on empirical data rather than on theoretical problems in sociology and cultural anthropology.

GEORGE E SIMPSON

Oberlin College

TERRIS, MILTON, and NATHAN A. KRAMER. *General Medical Care Programs in Local Health Departments: A Report to the Subcommittee on Medical Care, Committee on Administrative Practice, American Public Health Association.* Pp. vi, 129. New York: American Public Health Association, 1951. 50 cents.

Methods for the provision of medical care services are subjects for widespread discussion at the present time. The suggestion that many such services may be effectively administered at the local level in health departments has often been made. This suggestion, as with many other matters involving medical care, has both its advocates and opponents. In order to obtain information to determine its validity, a study of existing medical care programs now operating in health departments was undertaken by the staff of the Subcommittee on Medical Care of the American Public Health Association.

In this small volume the authors report and make some analysis of the findings of the study. Programs for medical care were found to be operating in 62 full-time health departments, 23 of which were in the State of Maryland. The scope of services varied greatly—from those in which the health officer also acted as county physician to complex programs aiming at integration of therapeutic and preventive medical services to individuals.

Details for the various plans studied are presented in both tabular and narrative form. The presentation provides to the reader a ready reference source on this type of administration of medical care. The authors conclude from their interpretation of the statistics that they support the contention that the administration of new medical care programs as they are developed can logically be entrusted to the health department.

Because 90 per cent of the plans described in the report provide services for the dependent group of the population, some readers may question how much support the survey data give to such a generalized proposition. It is clear, however, that the report amply demonstrates the fact that it is possible to administer medical care programs in health departments and that such arrangements provide interesting opportunities for increased integration of therapeutic and preventive medical practices. The account of these relationships should be of interest to the administrator, student, and observer of health and medical care programs.

JAMES P. DIXON
Department of Public Health
Philadelphia, Pennsylvania

MOLONEY, JAMES CLARK. *The Battle for Mental Health.* Pp. x, 105. New York: Philosophical Library, 1952. $3.50.

Dr. Moloney is already well known in psychiatric circles for many articles in professional journals on the subject of infant training on the island of Okinawa and in this country and for his book "The Magic Cloak." In the present little book, he writes in a vivid and provocative style in favor of the principles of the Cornelian Corner. This is an organization of psychiatrists, psychologists, and social workers in Detroit dedicated to the better emotional care of infants. Its principles are quoted thus:

"To promote healthy parent-child relationships . . .

"1. Through research in the fields of child development and family life,

"2. Through the education of parents, especially expectant mothers and fathers, as to the basic needs of the developing child, and

"3. Through the wide promulgation to professional groups as well as parents of all pertinent information regarding the developing child and his environmental needs,

(a) To strongly advocate the abandonment of the artificial practice of separating the newborn child from his parents, and

(b) With the conviction that it is advantageous to both mother and child. . . . [to] encourage breast feeding of the infants with opportunity to nurse whenever the infant is hungry or anxious."

Few child psychiatrists and psychoanalysts would disagree with these aims and means, but some question might be raised about Dr. Moloney's way of advocating them. He implies that by these methods all mental disorders and criminality can be eliminated or markedly reduced. It seems to this reviewer he claims too much. A warmer and more relaxed relation between mothers and infants should make for much better adjusted children and help to reduce the frequency and severity of many of the problems of normal childhood and make behavior problems and neuroses less prevalent. To demonstrate that these simple measures would have much effect on more deeply-seated psychic and social difficulties would require the comparison between a group of children raised by these methods over a period of ten or twenty years and a group raised by more rigid methods.

An obstetrician who reads page 65 and finds himself characterized as having "misanthropic attitudes toward the newborn," as feeling "most liked and most financially secure if they fawn before the mother," and as being in "unconscious conspiracy" and "collusion," will probably never get beyond that page. Less tactless language would gain more readers and adherents.

The adoption of aims and methods which the Cornelian Corner advocates should also help to alleviate those rigidities in our culture which the author describes so well. The help of well-trained members of other professional disciplines is also needed, including sociologists and cultural anthropologists. Our personal and social abnormalities will succumb only to planned and co-ordinated attack from many directions.

ROBERT A. CLARK, M.D.
University of Pittsburgh

ULICH, ROBERT. *Crisis and Hope in American Education.* Pp. xiv, 235. Boston: The Beacon Press, 1951. $3.75.

The author of this volume presents a thoughtful and thought-provoking appraisal of the American educational system. He finds in it much to be approved and much that is in need of fundamental change. Where adversely critical he feels the moral obligation to propose, in rather concrete terms, the needed reconstructions.

The central educational problem in America—and indeed in all democracies—is "to find a principle of conciliation between the seemingly contradictory trends of equality and individuality." Stated in other terms, how does a democracy devise an educational structure and program that meets its ideals of *equality* and *quality?* An educational structure that avoids division and differentiation, that does not adequately recognize and provide for differences in human capacities, may achieve the ideal of equality but at the price of sacrificing the ideal of quality. "The tension and friction of these contrasts is the essential challenge in the educational situation of democracy."

A very large part of the book is devoted to showing how, in the author's opinion, American education has failed to meet this challenge and how the challenge may be met more effectively. The prolongation of school age with the kind of educational structure and program now provided is indefensible; worse than that it may be a curse unless there goes with it a "revolutionary rethinking of the total program and a restructuring of the total educational system from the secondary school upwards." It is with this "rethinking" and "restructuring" that the author concerns himself.

No brief review can do justice to the author's position. It may be pointed out, however, that in his proposed plan for the reorganization of secondary education he would make intellect the sphere of differentiation and the culture of the emotions the uniting core of the program. The secondary school plant would consist of a group of buildings. The Community House would be a place where all pupils would assemble for their common activities, where the cultivation of the emotions would take place through music, poetry, art, and drama. Here, too, would be housed the general library. Other buildings would take care of the needs of various groups of pupils classified on the basis of intellectual abilities and interests. The proposed classification includes the small number who have true intellectual interests, (1) the humanists and (2) the scientists; other classifications include (3) the executive group, (4) the artisans, and (5) the workers.

Higher education is in no less need of rethinking and restructuring. The necessary directives in the philosophy of higher education may be found in the impregnating with meaning for our time of the traditional ideals of the gentleman and the scholar. The challenge of scholarship is to profit from the work of the specialist but somehow to see universal meaning behind the details of life. The traditions of the gentleman ideal (*humanitas*) and of scholarship (*veritas*) complement each other like two sides of a trangle which has as its base devotion to a universal order (*religio*).

Many readers will challenge what appears to be the author's social philosophy and his theory of knowledge. Even so, this is a book that should be read.

NEWTON EDWARDS

University of Chicago and
University of Texas

WILSON, HOWARD E. *Universities and World Affairs.* Pp. 88. New York: The Carnegie Endowment for International Peace, 1951. $1.00.

What is the responsibility of the free university in world affairs? How well are American universities fulfilling their obligations in this area? How can colleges and universities more effectively discharge their responsibilities not alone through the programs of a department or two, or the individual efforts of a few faculty members, but more broadly through a general university approach? How can the university, as a university, make the contributions required of it to promote better understanding of international affairs? In an endeavor to supply general answers to these sweeping questions, an exploratory inquiry was undertaken by committees from eight American colleges and universities in cooperation with committees from the American Council on Education and the Carnegie Endowment for International Peace. This small volume summarizes their findings.

The inquiry began with the formulation of a working paper embodying a systematic statement of ideas, assumptions, and questions regarding the universities and world affairs. This served as a basis for discussion by the survey groups and provided them a conceptual framework for the specific studies of individual college situations. Part I of this small volume presents the major points of the working paper in a concise form. Each college survey committee undertook to evaluate the hypotheses of the working paper by study of its own campus situation. In the process they not only arrived at an appraisal of the soundness of the working paper's assumptions, but brought forth additional ideas and problems as well. Part II of the book summarizes the experience of the eight university groups in their respective campus explorations.

The campus surveys provided both a validation of the tentative conclusions of the working paper and a demonstration of the value of such an inquiry to the universities. As a consequence the first recommendation of the general report is that each institution of higher learning take inventory of its programs, facilities, and plans in the area of world affairs. Part III of the book offers a systematic check list of items which should be covered in any such survey.

The author acted as a rapporteur for the undertaking and has produced a cogent and easy-reading book. Its clear and concise statement of the issues and problems should commend it to university administrators and to those teaching in the field. The book can well serve as a starting point for the kind of audit the author suggests each university might conduct.

The findings and conclusions of the report will probably come as no great surprise to persons in the field. That five "legitimate" areas for university action in world affairs are: instruction, research, encouragement of extracurricular activities, facilitation of student and faculty exchange with institutions abroad, and adult education, few will disagree. Nor will many take issue that education about world affairs is not the sole responsibility of specialists in the field. As universities are generally not too well "co-ordinated," it is also not surprising that co-ordination is inadequate in this particular field and that there are failures in the utilization of readily available university resources.

To this reviewer, the report marks a beginning. The questions which remain are more challenging than those answered. What is the most fruitful way to organize an interdisciplinary program for international studies within a university? Is it really worth the effort to try giving a general orientation on world affairs in a professional curriculum like engineering? Isn't it equally important that the engineer be given orientation in public administration, "human relations," and the like. Where do we draw the line? What is the proper role of the universities vis-à-vis the developing staff colleges like the Foreign Service Institute? Does a mere interchange of students and faculty with institutions abroad actually promote understanding, or is special orientation necessary? And finally, what do the committees and the author mean when they speak of a "world outlook"?

WILLIAM J. RONAN

New York University

HOLLIS, ERNEST V., and ALICE L. TAYLOR. *Social Work Education in the United States.* Pp. xix, 422. New York: Columbia University Press, 1951. $5.50.

Three years of inquiry and study by an educator, Ernest V. Hollis, Chief of College Education in the United States Office of Education, and by a social worker, Alice L. Taylor, Training Consultant in the Federal Bureau of Public Assistance, are expressed in this report on Education for Social Work in the United States. The authors did their work at the invitation and under the auspices of the National Council on Social Work Education with the understanding that their findings and recommendations would be their own. The study was made possible by a grant from the Carnegie Corporation.

The book starts with a competent review of the half century of education in this field, analyzes the present scope and status of social work, and estimates a considerable future growth. It then explores the undergraduate college in social work education, graduate professional education, the organization and administration of schools of social work, the responsibilities of the professional organizations in social work, and accreditation.

"Both social work and social workers," the authors say, "should be looked upon as evolving concepts that are as yet too fluid for precise definition." They take a practical way of delimiting the field, listing the titles of 155 positions which in 1950 served as the basis of the national survey of salaries and working conditions in social work made by the United States Bureau of Labor Statistics. Against a BLS estimate of a total of 75,000 positions they find only 18,000 members of professional social work organizations. Moreover, "between three fifths and three quarters of public assistance and related social workers" have not had any professional education and nearly half have less than college education.

As a means of enlarging the substantive content of social work education and offering it to a larger number of students they recommend "three separate but articulated functions for the undergraduate college": first, a broad program of general education for prospective social workers which would also serve "for identifying and teaching the basic concepts of social welfare that belong in the common cultural heritage of all college students." With this recommendation there will be agreement throughout the field of social work education and practice.

The second recommendation is offered guardedly and tentatively, namely, that the undergraduate college with proper safeguards offer semiprofessional preparation for social work technicians "if job analyses make it feasible." In this suggestion the authors are influenced largely by developments in medicine and related fields. It is a question, however, whether the analogy applies in social work where the problem is not so much a reallocation of duties within the area of professional practice as a distribution of tasks between social work and clerical activities, accounting, and other nonsocial-work specializations. Where social work itself is concerned the most successful experiments indicate the possibility, within large organizations, of specialization in practice rather than differentiation between professional and semiprofessional functions.

The third recommendation proposes a concentration, equivalent to a broad major, in the arts and sciences that would serve both as a foundation for graduate professional education and as a preparation for persons entering social agencies directly from the undergraduate college. In this connection the report advocates a four-year integrated program, two years undergraduate and two years graduate. The emphasis which the authors place, not only upon the social sciences but also upon the humanities and the biological and physical sciences would probably reduce the danger of an early technicalization of education for social work. It would be important, however, that admissions to the professional school should not be restricted to persons who at the beginning of their junior undergraduate year had decided upon social work as a career. It would be unfortunate to lose to social work the many people who do not make their vocational choices until later. Social work needs the infusion of rich personalities such as in the past it has welcomed from a wide variety of educational backgrounds and life experience.

The recommendation at the graduate professional level is for a generic curriculum, immediately for the first year, with an ultimate postponement of specialization beyond the second year. This plan, with very little modification, is feasible and, in some schools, is close to being in force.

The authors consider social casework, group work, and community organization to be major curricular areas rather than specializations. They would constitute administration, supervision, teaching, and research as fields for special education. Presumably advanced practice would also fall into this category. At this point it is important to recognize the double role of social casework, group work, and research.

All three make their specific contribution to a generic education but are, at the same time, special disciplines which for adequate practice need more than a generic education.

The report expresses concern about the "dichotomy that continues to exist between the classroom and the field work," and seems to be inclined to put the burden of proof on field work. This dichotomy need not exist and, where education for social work achieves its purposes, does not exist The work in the field provides the specific for the generalizations in class, and the discussions in class bring perspective to the practice in the field. In this process, and in the close working relationship between the field supervisors and the teachers of the seminars in practice, social work is perhaps making its greatest contribution to education. Where professional education is at its best, this integration extends to the teachers in the substantive areas. That the authors of the report have seen field work which is little more than apprenticeship and a dissociation of substantive and methodological teaching does not mean that there are not schools where an across-the-board integration has been and is being attained. Therein lies the essence of education for social work.

The teacher who has the privilege of working in a school in a university where there is a real interplay among the various faculties will endorse the emphasis of the authors upon the importance of the school of social work being a member of the university family. That, however, demands strong leadership in the school and a faculty willing to accept the intellectual challenge of association with its colleagues in other disciplines.

The authors of the report had a most difficult assignment in surveying a field which is still in process of definition and where the profession has yet to clarify its purposes and to agree upon its content. If, in places, the report is difficult to read and understand, in that respect it is a true reflection of the situation of a profession in course of evolution. The authors have struck at the main problems in the field. They have produced a document that is now, and will long be, a taking-off point for discussion in faculties and professional organizations. They have left a substantial and stimulating agenda for the National Council on Social Work Education.

KARL DE SCHWEINITZ
University of California
Los Angeles

WIETING, C. MAURICE. *The Progress of Cooperatives; With Aids for Teachers.* Pp. xiv, 210. New York: Harper & Brothers, 1952. $3.00.

This book is an expansion of earlier writings of the same author which treated education concerning the co-operative movement. Despite the expansion, it is all too brief. It is possible however that a longer volume would not prove so attractive to the audience for which it was intended. *The Progress of Cooperatives* does not pose as a scholarly study. It was written as a manual for teachers, and it will serve this purpose admirably.

The book consists of three parts, the first of which gives information concerning co-operatives. Here are discussed the principles of co-operation and the history of the co-operative movement. Separate chapters deal with various types of co-operatives. Emphasis is given to the United States, but there is a brief treatment of the co-operative movement in other parts of the world. Part I closes with an "appraisal of cooperatives." Needless to say, the conclusions are favorable to the movement. Part II is devoted to the educational activities of co-operatives in the United States. Part III, which takes up more than half the book, has to do with teaching about co-operatives. Here the author describes the status of education concerning co-operatives in the schools and makes suggestions for fitting the study of co-operatives into several kinds of curricula.

In his suggestions for teachers who plan their own units the author makes an important contribution to educational literature and to school programs. He presents an outline of content for the study of co-operatives; a list of eighty-seven suggested activities; a twelve-page annotated bibliography, much of it referring to free or inexpensive materials; a nine-page list of teaching films; and a three-page list of organizations and agencies from which teachers may obtain further information. Numerous specific examples of real co-operative activities carried on in particular school systems are discussed.

Mr. Wieting has provided a valuable classroom aid to teachers. The book is an example of the kind of help which should exist in many fields. The treatment of some phases of the co-operative movement is brief and inadequate. But the class which begins with *The Progress of Cooperatives* and goes on, as its author intended, to exploit the sources of information and the kinds of learning activities suggested will find the path to understanding the value and potential of co-operatives for society an easier one.

William H. Cartwright
Duke University

PHILOSOPHY AND RELIGION

Wach, Joachim. *Types of Religious Experience, Christian and Non-Christian.* Pp. xvi, 275. Chicago: University of Chicago Press, 1951. $3.50.

In this collection of ten scholarly essays, five of which have been previously published in English and one in German, the Professor of the History of Religions in the University of Chicago explores the nature of religious experience and offers criteria for distinguishing it from other types of experience.

The essays fall into three groups. The first group deals with questions of methodology and contains the author's conclusions drawn from analyses of the religious phenomenon in its great variety. The second and third groups contain specimens of the detailed studies of particular types of religious experience and thought on which the general conclusions rest. The second group deals with non-Christian religions. It contains three essays, one on the idea of man in the Near Eastern religions, one on the Sufi movement in Islam, and one on Mahayana Buddhism. The third group is concerned with Christianity. One of the essays analyzes the religious thought of Kaspar Schwenkfeld, a sixteenth-century Protestant spiritualist and a leader of the "Left-wing Reformation," another deals with the role of religion in the social philosophy of Alexis de Tocqueville, a Catholic historian and statesman of the nineteenth century who sought to reconcile religious principles with progressive thought. The third paper in this group, on *Church, Denomination and Sect,* is a study of how religion expresses itself in social organization. The fourth is an appreciative analysis of Rudolph Otto's *Idea of the Holy.*

These studies in the history of religion are all interesting and valuable in themselves but their chief importance for their author is for their bearing on the general interpretation of religion given in the essays of Part I. In the first of these, on the place of the history of religions in the study of theology, he argues for "an inclusive concept of revelation according to which the whole history of religion should be viewed as divine self-disclosure" (p. 25). In the second, on universals in religion, he proposes four criteria which together distinguish an experience as religious. It is (a) a total response of the total being; (b) a response to what is regarded as ultimate reality; (c) the experience is "existential," the most intense of which man is capable; (d) it involves an imperative, a commitment which impels man to act. In the expressions of such experience the world over, he shows, there is an amazing similarity of structure.

The general tenor of these essays supports Rudolph Otto's interpretation of religion as rooted in the mystical sense of the "numinous," but they do not illuminate the crucial question which Otto left unsolved—that of the fundamental connection of the mystical and moral elements in religious experience.

A. Campbell Garnett
University of Wisconsin

Hedley, George. *The Superstitions of the Irreligious.* Pp. xii, 140. New York: The Macmillan Company, 1951. $2.50.

Hedley has written a book worth reading because it is full of interesting information. Few will not find in it much that to them is novel, tellingly presented. The thesis of the author is well expressed in his title: that the so-called, or self-called, irreligious people oppose traditional religion because they think it impracticable, unrealistic, unprogressive, an opiate, but do not themselves feel any responsibility for informing themselves about what they are denouncing. Such people "discount religion because they suppose it uninformed and irrational. . . . They themselves are uninformed and irrational, and therefore utterly superstitious, until they seek authentic information on the subject and until they do some sober reasoning about it." To combat such ignorant condemnation Hedley marshals a most unusual apologetic, in which he points out the use of the best scholarly methods by biblical critics (one reads with particular sympathy his disparagement of courses in the Bible as literature given by people from departments of literature, who are utterly ignorant of that scholarship), the social activity of the churches in the last sixty or more years, and the basic fact that to try to live a life without ideals is the most idealistic of all approaches to life.

Still, if Hedley has written an interesting book, it is not a profound one. He is seen to be most at a loss in his concluding chapter. He has presented his mass of evidence for the value of religion, while steadily admitting that the churches and churchmen have not always lived up to the ideal of their faith. But his presentation has been as much a special pleading for traditional religion as those of his "oppenents" have tended to special pleadings against it. He quotes at the end a "distinguished friend" who disliked religion. Hedley forced the friend to admit that he called anything he did not like "religion." Hedley is doing exactly the same on the other side. The matter is not to be helped by presenting a list only of the virtues of traditional religion to those who can see only its defects. Hedley admits at the end that probably few of those for whom the book was designed will read it, and that the great majority of his readers will be those who needed no convincing. If he really hoped to accomplish his purpose of reaching the "irreligious," one would have thought he would have begun again on a different sort of book.

A still deeper defect in Hedley's thinking is that he calls "the irreligious" those who reject traditional Judeo-Christianity, and says that they should investigate "religion" before they decide against it. But he admits that the people he is talking about "are religious men and women," are indeed "very religious." Where are we, then, and where is Hedley? If "the irreligious" are actually "very religious" there must be other bases and formulations of religion, even in our civilization, than the acceptance of Judeo-Christian creeds and forms of worship. If Hedley wants to meet his audience, he must find these bases and accept them. That is a large task, but someone must do it if the spiritual forces of our age are not to go on calling themselves "irreligious," and so lose much of their power to lead and inspire.

ERWIN R. GOODENOUGH

Yale University

MILLER, EDWARD. *The Abbey & Bishopric of Ely: The Social History of an Ecclesiastical Estate from the Tenth Century to the Early Fourteenth Century.* Pp. xiii, 313. New York: Cambridge University Press, 1951. $5.00.

It has been said that feudalism is extremely complex and fundamentally simple. The simplicities of the feudal age, however, can be discovered only through a multiplicity of particulars. The value of Edward Miller's book is in the abundance of pertinent and interesting facts he uses to establish his general conclusions. This is an important contribution to medieval studies and a most welcome addition to the limited number of works available for an understanding of the medieval social pattern. Social history is, perhaps, the most difficult of all forms of history to define and equally hard to delimit. The truth of this generalization is obvious even for a study of the restricted areas of Ely lands. Since social relationships were political, administrative, and economic, medieval men like the abbots and bishops of

Ely were often perplexed when forced to define precisely the nature of specific social types. This admirable study demonstrates this difficulty explicitly on almost every page.

Although he is forced often by lack of adequate sources to present tentative conclusions, the author has faced squarely the challenge of origins and has not turned with fright from "that obscurity which covers all the peoples of the Middle Ages." He shows at least the achievement of the abbots of Ely in acquiring lands between 970 and 1020, which "in virtue both of its magnitude and its rapidity, must have had major social consequences. . . . The work which was done in a brief half-century endured for near six hundred years." A chapter on "The Old English Estate and the Norman Conquest" gives vividly an indication of what the change to a new order could bring. Naturally the survey of 1086 must be relied upon, and we know more than we otherwise could without it "if the words of *Domesday Book* mean what they say. . . ." We are, however, not always sure they do. A chapter on "The Medieval Estates of the Bishops of Ely" will attract the specialist, but one devoted to "The Peasantry" deserves a wide circle of readers. After reading this essay few could retain faith in oversimplified clichés of text-books, for Miller demonstrates incontestably how lines of social status were vague, indeterminate, overlapping, and confused, rather than the clearly marked delimitations that are the lawyers' delight. " 'Omnes homines aut liberi sunt aut servi,' Bracton would say; and that would be true enough in the eyes of the law. But the law, and especially a law so Roman as this, was no very good guide to social relationships."

"The Honour of St. Etheldreda" and "The Liberty of St. Etheldreda" are each examined in separated chapters which can only be noted here. These are important and worthy of careful attention, but they are of less general interest than the concluding section describing "Administration." If the problems and requirements of the earlier days seem relatively simple, the administrative demands of the thirteenth century were great. By then the Bishops of Ely had a kind of permanent civil service. Professionals in administration and the technically trained were available to assume the burdensome functions essential to maintain the integrity of extensive lands.

GRAY C. BOYCE

Northwestern University

BARON, SALO WITTMAYER. *A Social and Religious History of the Jews.* "Ancient Times." Two volumes. Pp. xiii, 415; 493. 2nd ed., rev. and enlarged. New York: Columbia University Press, 1952. $12.50.

These two impressively documented and indexed volumes, which survey the cultural history of the ancient Jews through the Talmudic Age, are to be followed by possibly five more. Professor Baron has kept alert to historians' and classical archeologists' advances in research; these motivated an enlargement of his earlier three-volume study of 1937. The more than two hundred pages of notes are rich in bibliographic citations and critical comment. Baron's work, which is leveled at scholars, is based upon an almost encyclopedic accumulation of information and on an examination of all relevant secondary sources.

It is a pity that this massive work, the fullest and most up-to-date general study in English on the cultural history of the ancient Jews, has not ventured beyond the outdated canons of interpretation of exotic cultures still found among otherwise excellent historians. The central criticism is that, like so much of contemporary historiography, Baron's phrasings regarding cultures and culture change are of the vintage of the 1920's or earlier in historiography. Baron has remained handicapped by the current academic ailment of specialist self-segregation. Except for classical archeology, he is largely unfamiliar with contiguous social sciences.

An anthropological reviewer notes with horror Baron's speaking (1: 49) of Semitic and other races in the Near East. He says (1: 172) that one cause of Jewish numerical expansion by the time of Christ was partly due to proselytism and partly to "the natural increase of a highly prolific race," that is, the Jews. He writes repeatedly of a medley of races in the Near East. Even the Phoenicians become a race (1: 176), and finally we read (2: 23) of "racially pure Jews." If we can ignore the ridiculous implication that the Jews were once especially fecund because of their race, the confusion appears to be terminological: by race Baron really means tribal or cultural group.

One of the weak portions of his study is in the discussions of feminine social status (1: 58; 2: 235–241). His criteria of such status are unclear. But he assures us, in an almost Nazi passage, that the "concentration of women's activities upon her home . . . while perhaps prejudicial to her general economic and social standing, had nevertheless great value for the preservation of the [Jewish] nation's physical and moral strength."

He writes confusingly of an ancient precapitalistic system and of precapitalistic forms of exploitation (1: 68–69); of ancient industrialists, proletariat and bourgeois (1: 73–74), when such terms might best be reserved for analyses of social phenomena of modern centuries. He asserts (1: 51) that in early preagricultural seminomadic times, the Jews owned herds communally. This deduction needs documentation in order to controvert the weight of anthropological evidence that herds of domesticated animals are almost always privately owned by individuals or lineages. Time and again he uses the term "nation" for what is much more fittingly called a tribe or federation of tribes. There is still less aptness in his use of "nation" for widely scattered Diaspora groups of most diverse linguistic and cultural features, although such groups shared a religio-cultural heritage and similar historical experiences.

Baron's interpretations of cultural phenomena improve, and his extrapolations of inappropriate concepts and terms that are suitable for modern times lessen, as he moves into the Roman Empire. His comprehension of that culture is better not because the sources for it are fuller but because it is easier to comprehend a culture that is closer to our own. Although he has served specialist scholarship admirably in his monumental assembling of studies of ancient times, his interpretive discussions of ancient cultural phenomena outside of Rome and Greece are largely old hat or do not stand up in the light of cultural anthropology. But the compilation that he has achieved will make interpretations of Jewish culture history easier for historical scholars who are also oriented in disciplines such as cultural anthropology and social psychology.

MELVILLE JACOBS
University of Washington

COMMONWEALTH OF NATIONS

CARR, EDWARD HALLETT. *The New Society*. Pp. vii, 119. London: Macmillan & Co. (distributed in the U. S. by The Macmillan Company), 1951. $1.60.

We have moved far away from the conceptions and from the conditions out of which the democratic tradition was born. This is the theme for six radio lectures by Mr. Carr for British audiences in mid-1951, the series being reproduced here without substantial change.

While the process of increasing government services is not new, their increasing scope, changing nature, and handling at national levels are remaking contemporary society. The present need for state economic planning arose from (1) the great depression and (2) preparedness programs for war.

The approach to an understanding of problems of our "new society" should be historical. Mr. Carr emphasizes the continuity of history, which "moves constantly and never returns to the same place" (p. 5). There are fashions in writing history; the historian moves with the times (p. 14). Today's looking back, at least to the American, French, and industrial revolutions, should be not for solutions but for critical insights.

In sequence there appeared unrestrained private enterprise, competition, monopoly, and governmental regulation. We are now in the period of the "welfare state," the transition to which the author considers inevitable, if for nothing else than to care for unemployment. The laissez-faire economic whips to force people to make their own way were unemployment and hunger. We now have governmental relief of "the poor and the wretched," health services, and food subsidies. Will guaranteed full employment and other social services weaken the initiative and independence of the worker? The author does not think so. After discarding the former whips what is needed, he suggests, is "the creation of a new philosophy which will furnish an incentive and a reinforcement for the new social habit of work" (p. 53). The inducement of higher living standards might be substituted for economic penalties. He would also nationalize the major part of industry.

The lectures stress British movements but for illustration draw also on many changes in American economic life. The author concludes, "This is an American century in the same sense and with the same right as the last century was a British century" (p. 84).

If sometimes pessimistic in conviction, the always forthright author balances that attitude with a measure of reasonable optimism for the future. Some will dispute the generalization that private laissez-faire capitalism has been dead everywhere outside the United States for twenty years (p. 31). In the lecture contrasting "individualism" with "mass democracy," it might have been shown that individual rights and the "general will" have quite different ends in view. When speaking of individual rights we mean, more often than not, those rights sheltered against governmental encroachment. The general will simply contrasts with an individual will, say that of a sovereign. Majority rule applies within a legislature, moreover, not only for the general electorate. Nowhere do democratic processes require the mass of voters to determine policy that sets technical details. Lincoln probably meant government of the sovereign people, for the people, by the representatives of the people.

VERNON J. PURYEAR

University of California

ROWNTREE, B. SEEBOHM, and G. R. LAVERS. *English Life and Leisure.* Pp. xvi, 482. New York: Longmans, Green and Co., 1951. $4.00.

This volume is an interesting contribution to sociological literature for three reasons: it combines the case-study technique with data derived from statistical reports and interviews; it includes selected cultural aspects of life in England, Wales, and the Scandinavian countries; and it is written with a view to influencing behavior patterns.

The basic data of the analysis are 975 case studies, the facts and judgments in each case procured after sufficient acquaintance to make them a matter of informal conversations. A total of 220 cases are presented in the first chapter. Other data were obtained from reports and from interviews with police officers, social workers, and others.

The areas of cultural life selected for study are: commercialized gambling, drinking, smoking, sexual promiscuity, honesty, the cinema, the stage, broadcasting, dancing, reading habits, adult education, and religion. The last two chapters do not follow this specific approach. One is a community survey of leisure-time activities in an English town; the other is a superficial survey of leisure activities in each of the Scandinavian countries.

The authors are convinced that vigorous steps need to be taken to reverse the current trend, for each analysis leads them to conclude that behavior patterns are below the standards "of higher qualities that distinguish great nations and great individuals within a nation." They concede that the English people have a high respect for law and an enviable tradition of voluntary work with such organizations as youth clubs and the Red Cross but consider these the "unsensational blessings, won by sacrifice and effort in the past and maintained by good sense, and as a consequence of our reasonably civilized outlook."

In spite of the authors' seemingly pessimistic conclusions, they come to a positive proposal in relation to each area discussed. Some would criticize the fact that, while the report is factual, the conclusions are based upon value judgments. These are primarily drawn from Christian ethics but are justified by the authors not only on moral and spiritual grounds, but, even more, on the grounds of national interest.

FRANCIS J. BROWN

American Council on Education
Washington, D. C.

WEDGWOOD, C. V. *The Last of the Radicals: Josiah Wedgwood, M. P.* Pp. 252. London: Jonathan Cape (distributed in the U. S. by The Macmillan Company), 1951. $3.00.

It is good to know that the life of the last radical has been written. This seems unbelievable. The way in which the author follows her uncle's request to give this title to his biography is indicative of her devotion throughout the work. She goes so far as to put herself into the story to a minor degree toward the close of the book, giving indications of her uncle's attitude toward her. And yet, she does not violate the canons of good biographical writing too openly.

Josiah Wedgwood, M. P., had the advantages of family and fortune, and the disadvantages. The biographer reveals a man whose life was too easy. Being from the Wedgwood family, he could afford to be outspokenly liberal and increasingly eccentric. He loved a contest with forces of darkness, monopoly, conservatism, or tyranny—so long as the contest needed him. When success approached, he would drop out and take up another cause. He was a leader of lost causes and happy as a warrior in naval, political, or social battles. His daring was his pride and may have inspired others many times; but his liberalism made him see the other side of each cause as well as his own side so that if the opposition became an underdog he might turn to help it. He fought for Zionism, for instance, but while so doing he helped the non-Zionists if they called upon him.

The one passion of his life and the one solution for all of the troubles of our civilization was the single tax reform. Henry George gave him a lifelong cause and gave him an all-inclusive answer. His solution to the vast array of public issues was a bit too simple for lasting results.

The student of history and politics will find in this enthusiastic review of a liberal and a labor leader in Parliament a number of ideas worth getting. "Josh" Wedgwood was a member of Parliament from 1906 to 1942 when he was raised to the peerage and entered the House of Lords, which he had earlier scorned. The reviewer found the struggle for civil liberties in England of value; he enjoyed the story of a life so buoyant that its subject could stand for independence of thought in his own family to the extent that it worried even himself when his two daughters became pacifists; it is good to have the intimate view of the battle at Gallipoli in 1915 and the accounts of Wedgwood's trips to America to talk with Colonel House about peace terms and to Vladivostok to try to hold the Russians in their Allied war efforts after the March revolution of 1917. The part played in the Zionist movement is worth reading, and there are some good sidelights on the colonial reform movements in Nigeria and South Africa. In the main it is just a good story of a dynamic, humanity-loving Englishman who revelled in lost causes and came to think by the time he died in 1943 that he, himself, was a lost cause.

One wonders whether he was ever an asset to the Liberal party or to the Independent Labor party, or later to the Labor party to which he belonged; but he was a colorful figure, a voluminous writer, a champion of civil liberties and of freedom for all men and women of all races and creeds. It must have been exasperating to work with "Josh" Wedgwood, but a continuing inspiration to have felt his daring and reckless optimism. English and American liberalism owes much to such men as Josiah Wedgwood. We trust that he is not the last of the radicals.

W. HENRY COOKE

Claremont Graduate School

RUSSELL, BERTRAND. *New Hopes for a Changing World.* Pp. 213. New York: Simon and Schuster, 1952. $3.00.

Gilbert Murray once entitled a chapter on the Hellenistic period "The Failure of Nerve." By that phrase he meant the mood of despair which led people to abandon any real hope for a rational solution of their problems. It may be that future historians—if there should be any—will characterize our age in the same way. We are the creatures of chance and fate, which in the end are the same, blind and inscrutable forces, to which we must reconcile ourselves. In Hellenistic times these post-rational systems grounded on a despair of reason were philosophies such as Stoicism and Epicureanism, or religious cults like those of Mithraism and Christianity. Today, for many people, Existentialism, Thomism, and Marxism perform a similar function. Ours is an age of retreat, one in which nihilism and dogmatism seem the only alternatives. A tragic example is that of H. G. Wells. This heroic and lifelong prophet of the Western philosophy of enlightenment and progress at the last concluded: "A frightful queerness has come into life. . . . The writer is convinced that there is no way out, or around, or through the impasse. It is the end."

This is the problem to which we expect Bertrand Russell, from the title of his book, to address himself, and it is disappointing to find that if the world has changed, he has not. One hoped Russell would apply his trenchant intellect to the causes of our despair, that he would give us some real grounds for hope. Instead, he remains where he was all of fifty years ago. When he wrote the melodramatically eloquent essay, "A Free Man's Worship," he admonished us, like true Stoics, to wrap ourselves in the impregnable mantle of our ideals. Thus do we become immune to the assaults of chance and fate.

Russell's stoical temperament thus makes him incapable of coming to grips with the problem. In a revealing passage near the end of the present work he remarks:

"I have not, however, in this book dwelt much upon the reasons for fear, since I do not think that it is through fear that we shall avoid the dangers that threaten us. Our world has too much of fear, and emphasis upon dangers is apt to lead to apathetic despair. What our world needs is the opposite; it needs rational creative hope; it needs something positive to live for. It needs 'yes' feelings rather than 'no' feelings. If the 'yes' feelings are as strong as a purely rational consideration allows them to be, the 'no' feelings will melt away and become unnecessary. But if we dwell upon 'no' feelings too much, we shall never emerge from despair" (pp. 206–207).

And so the whole book is a series of "if-then" propositions: *If* we were more rational in dealing with population problems, with conflicts of class and nation, of creed and race, *if* we could rid ourselves of obsolete ideas, of groundless anxieties and of irrational fears by instituting a juster society and a more sensible kind of education, *then* we should have peace with happiness and progress unlimited. On this the only proper comment is, "O brave new world, that has such people in't."

Thus Bertrand Russell vacillates between hoping that on an *off chance* events may take this fortunate turn and the compensatory mood of stoic resignation. When he is thinking of these wholly rational creatures, his optimism is unbounded He says, for instance—and I have no doubt of it either—that "it would be completely possible to make the whole world within fifty years as prosperous as the United States is now." But then he reflects that there is only too much reason to fear that Western civilization as we have known it is poised on the verge of the *fatal* abyss. Resuming the Stoic's mantle, he assures us, "And so long as man continues to exist, we may be pretty sure that, whatever he may suffer for a time, and whatever brightness may be eclipsed, he will emerge sooner or later, perhaps strengthened and reinvigorated by a period of mental sleep" (p. 186). Such is Bertrand Russell's unchanging advice to this changing world. Can a world that is plunging headlong in its furious course be expected to heed it?

GAIL KENNEDY

Amherst College

DUE, JOHN F. *The General Manufacturers Sales Tax in Canada.* Canadian Tax Papers No. 3. Pp. xi, 202. Toronto: Canadian Tax Foundation, 1951. $2.00.

The present volume is to be welcomed on this side of the border as well as in its home country. There has been intermittent agitation for a federal sales tax in this country for some years. This clear orderly history and description of the Canadian tax will be of particular value if a manufacturers' levy is again seriously considered. The usefulness of the book is much broader than this, however. Much of the discussion is pertinent to other forms of sales taxes and to other levels of government.

Canada imposed a 1 per cent turnover tax in 1920 in an attempt to meet heavy postwar expenses. It was changed to a manufacturers' levy in 1924. For the sixteen years from 1936 to 1951, the tax was imposed at the rate of 8 per cent, but was increased to 10 per cent in 1951.

Small manufacturers are exempt, and goods used in production are generally excluded from the tax. Most foods, certain articles for medical use, several major categories of building materials, electric power and fuel, and goods for educational and religious purposes are also exempt. Due to the various exclusions and exemptions the sales tax yield in 1950 with an 8 per cent rate was 3.6 per cent of total consumer expenditures. With a 10 per cent rate it is estimated that the consumer tax burden will be about 4.5 per cent.

The tax has been a productive one. It yielded 31 per cent of federal tax revenues in 1938. Due to heavy increases in other taxes, however, it dropped in relative importance during the war and was down to 10 per cent of tax revenues in 1945 and 1946. The current yield is around 17 per cent. From 1932 to 1943 the sales tax was far more productive than the personal income tax. It has been outstripped by the income tax since then.

Summarizing briefly, the principal findings of the study are that the tax is highly productive and well administered. Collection costs are low. There is evidence of pyramiding since markup percentages are applied to new purchase prices. In general the tax appears to be shifted to consumers. Due mainly to exemption of food, there appears to be only slight, if any, regression below the $4,000 income level. Above that point the burden of the tax becomes less as incomes increase.

Arguments for the tax, in addition to its productivity and administrative feasibility, are that it is less harmful incentivewise than the income tax and that it tends to hold inflation in check. The author feels that a personal income tax falling with the same weight as the sales tax does upon various income groups would be no more injurious to incentives. He does not compare the effect of the sales tax with the corporate income tax in this connection, nor does he compare these two taxes with respect to their influence upon management decisions.

The argument against the tax rests mainly on grounds of equity, since it constitutes a substantial burden upon low income groups. The author does not favor retention of the tax as a permanent feature of the revenue system.

MABEL L. WALKER

Tax Institute
Princeton, New Jersey

PERRY, J. HARVEY. *Taxation in Canada* Pp. xiii, 409. Toronto: University of Toronto Press, 1951. $6.00.

The author is an officer of the Department of Finance with more than fifteen years experience in practical tax matters. *Taxation in Canada* is a description of the current Canadian tax structure—Dominion, provincial, and municipal—and also in part of the Canadian governmental organization and of the nature of the Canadian economy. The fiscal, the political, and the economic are effectively interwoven in nontechnical yet authoritative exposition designed to appeal both to the layman and the tax expert.

Essentially the author's concern is with the provisions of the statutes and with their elucidation. Mr. Perry does not pretend to deal exhaustively with such matters as the shifting and incidence of taxation nor with the broad problem of fiscal policy.

Many chapters conclude with a short separately spaced summary of their content together with a tabular statement of the percentage of tax revenue and total revenue provided by a given tax. An adequate bibliography, chapter by chapter, appears at the end of the book. Various tables throughout and in the appendix enlighten and supplement the text. Frequent and at times extensive reference is made to court decisions. The specific and important problem of tax administration is discussed in concluding chapters.

Mr. Perry makes his work interesting and instructive to the American reader by comparisons or contrasts often made between Canadian and American facts and procedures as for instance the contrast between the concepts of income or between the positions of local assessors in the two countries.

Certain chapters are worthy of especial mention. They deal with the historical development of the Canadian tax system, with certain constitutional aspects of taxation, with budgetary procedures, and, as has been said, with administration.

Some of the material presented is transient in nature as are the facts as to current tax rates, but most of the substance is of fundamental and permanent nature, dealing as it does with the taxes which must support government and with their legal and constitutional foundations.

Mr. Perry has drawn in clear lines an informative over-all picture of the Canadian tax structure. One might wish for a brief concluding chapter to focus the scene, but, although this does not appear, the reader feels that competent workmanship and a sense of symmetry and artistry simply expressed have produced a certain feeling of warmth which works on taxation do not always engender in him.

MARVEL STOCKWELL
University of California
Los Angeles

KOTHARI, SHANTILAL. *India's Emerging Foreign Policies.* Pp. viii, 220. Bombay: Vora & Co., 1951. $2.00.

It is obviously valuable to know what Indians are thinking about their policies and ours. Mr. Kothari's small volume, done as a project at the University of California, will be useful in this respect. He has undertaken an exposition and defense of India's major present positions and has suggested what he regards as an imperative next step.

In his view the present world scene represents a struggle between two power blocs led respectively by the Soviet Union and the United States. The struggle, he says, is essentially economic in its origin since it is the clash between communism, represented by Russia, and monopoly capitalism, represented by the United States.

India, in this analysis, faces two dangers, two putative antagonists. The first is Soviet communism, the second is "Anglo-American imperialism." The danger from the first is more acute, he believes, but the second is also a potential threat. India must be on guard against both.

In the event of a shooting war, he holds, India could not be neutral and would inevitably line up with the Western world. In a "cold war," on the other hand, it is his judgment that India should and must remain neutral, the better to serve the cause of peace. This is the explanation of India's policy toward Communist China. It is Mr. Kothari's thesis that it has not yet been determined that Communist China is a Soviet satellite and that, if it is eventually so determined, India's policy will have to be modified.

Meanwhile India will continue to work for better international understanding, independence for all subject peoples, an end to all racial discrimination, and a co-operative opposition to all forms of "imperialism."

The imperative next step, he declares, is the formation of a working South Asian alliance to resist aggression from any quarter. He is opposed to co-operation in any similar Pacific pact since the latter would involve some non-Asian states. He does not believe in nonviolent methods and is critical of Gandhi on this score. He is, himself a partisan of Subhas Chandra Bose, the Indian nationalist who went over to the Japanese. His argument for the cultural values of such an alliance, which it stresses, is persuasive. His picture of it as a strong physically defensive position falls flat when he states clearly that the security of the area is dependent upon the sea power of the United Kingdom and the United States. He is, nevertheless, opposed to any ties to the West and suggests that India's withdrawal from the Commonwealth is probably imminent.

The Western reader will be informed, but slightly bewildered, by the acute hypersensitivity that is revealed. At times it amounts almost to a persecution complex. How else could one explain a statement such as this: "European diplomacy, nearly [neatly?] aligned under American leadership in international politics, is active in preventing India from becoming a strong nation." This is in the class with the almost pathological fear of "imperialism" that pervades the book and which, coupled with the total myopia in respect to Soviet imperialism, gives it an air of unreality.

ROBERT AURA SMITH
The New York Times

VAKIL, C. N., and P. R. BRAHMANANDA. *Planning for a Shortage Economy: The Indian Experiment.* Pp. 320. Bombay, India: Vora and Co., 1952. Price Rs 5/8. paper; Rs 7.– cloth.

The old story that India is a land of fabulous wealth is decently buried. The magnificence and grandeur of the Indian princes has also disappeared with the withdrawal of British administration from the country. One hears nowadays nothing but reports of direct poverty of the Indian masses. In Brahmanic philosophy this poverty was once lauded highly. But it is no longer accepted as a source of greatness or spirituality, but rather is condemned as a menace to the physical, intellectual, and moral stamina of the Indian nation and as a threat to the expansion of the democratic ideal in the land. The amelioration of mass poverty is believed to be the greatest problem India has to face now.

To remove the specter of poverty that stalks in India, a group of merchants brought out a plan, known as the Bombay Plan, in 1944. Other people also came out with other plans such as the People's Plan, the Gandhian Plan, the Visvesarya Plan and so on. In fact, so many plans were hatched in so short a time that even the stolid Government of India was accelerated into action and appointed an Advisory Planning Board to look into the matter in 1946. But the partition which took place in the next year set at naught most of the calculations of the Board. The regions which produced a surplus of wheat and most of the cotton and jute fell to the share of Pakistan. A large number of displaced persons who needed immediate rehabilitation further complicated the problem. The new government that came into the saddle appointed a National Planning Commission in 1948. Two years later, it submitted a six-year plan to the Commonwealth Consultative Committee which held its session in Colombo. The desire was to enlist the sympathy of the Commonwealth countries in a large co-operative scheme to rebuild the economy of the war-torn regions of southern Asia. But unfortunately the countries to which the appeal was made were not in a sufficiently financially solvent condition to take up the steps suggested. So the Government of India modified the plan and brought out a new version of it, to reconstruct the economy of the country. Vakil and Brahmananda's book discusses the new Five-Year Plan (1952 to 1957) propounded by the Indian administration.

The plan has many objectives: to solve the problem caused by the shortage of raw materials, essential consumer goods, and housing; to fight the high and rising prices and the growing cost of living; to rehabilitate the persons displaced by partition; to utilize social resources to suppress blackmarketing and profiteering; to readjust the economy; and to develop the country. Thus, the problems it sets out to tackle are immediate. It does not consider the nationalization of industries, nor does it suggest any structural change in community life to provide for social justice.

The government sets out with 17,930 million rupees to carry out the scheme, from which it anticipates raising 11,210 million by internal loan, 3,950 million by utilization of the money earmarked in the budget for social services; 2,000 million from various surplus balances; 2,500 from small savings and unfunded debts; and 1,140 million from the organized capital market. When put into effect, agriculture will absorb 13 per cent of the investment, irrigation and power plants 30 per cent, transport and communications 26, industry and minerals 7, social services 17, rehabilitation 5, and miscellaneous items 2 per cent.

The objectives of the plan are limited. The authors believe that if they can be realized within the five years of the program, and the damage done to the economy by the war and partition repaired, the country will have a substantial basis for planning another advance with greater success and less friction. We agree.

It is unfortunate that many of the figures supplied by the Planning Commission have to be modified and changed from year to year. The reason is that the Indian government does not yet have exact statistical data on which sound planning can be based. The authors are aware of the fact and plead for economic research. We again support the plea.

The book is well written and, compared with other Indian publications, well printed. As an exposition of the present five-year plan, it serves a useful purpose.

N. G. D. JOARDAR

Washington, D. C.

FUCHS, STEPHEN. *The Children of Hari: A Study of the Nimar Balahis in the Central Provinces of India.* Pp. xviii, 463, XXII plates. New York: Frederick A. Praeger, 1951. $7.50.

This work is an anthropological-sociological description of an "untouchable" agricultural group known as Balahis, especially those who live in the Nimar district in the southwest corner of the Central Provinces (now known as Madhya Pradesh) of India. These are one of the economically and educationally backward peoples of India. The author, as a missionary working among this people and at the same time a trained anthropologist, utilized his opportunity for a long-onctinued field study. The book is one of the most complete accounts we have of any Indian group.

After a brief, too brief, introduction of 16 pages on the geographical, historical, and racial background of the Balahis, Father Fuchs treats their culture in over 400 more pages under the four heads of sociology, the life history of an individual, religion and magic, and material culture. There are 79 illustrations (line drawings and photographs), a glossary (which like the text never gives a transliteration of Indian words that would indicate pronunciation), and an index.

The Balahis appear to have been Hinduized in relatively recent times, and their Hinduization is very imperfect; that is to say, their social customs do not correspond with any exactitude to the ideal demands of the orothodox texts. But since few, if any, low-caste Hindu groups do have institutions that would satisfy the religious and legalistic purists, the Balahis may be viewed as a typical group living by a variety of what is often for convenience called the lower Hinduism. They have "Brahmans," to be sure, but these appear to be by origin Balahis who have taken over priestly functions and not historical Aryan Brahmans, and they are reputed among the Balahis to eat meat as does the community generally. The Balahis' religion is directed toward propitiation of clan gods, of the mother goddesses, and of various demons with the use of special festivals, ceremonies, and cult practices, in all of which the major Hindu deities and epic and puranic mythology have only a vague and fugitive part.

In a final brief chapter the author writes of the future of the Balahis, holding out little hope for them unless the Hindu community as a whole changes its basic attitude toward untouchability. His remarks may be considered applicable to all Untouchables. Mere good will on the part of socially minded reformers like Gandhi or a mere constitutional provision as in the Constitution of 1950, which claims that it "abolishes untouchability," does not appear to him adequate. Presumably Dr. B. R. Ambedkar, himself an Untouchable, chief leader of the Untouchables and principal architect of the 1950 Constitution, had the same opinion last autumn when he resigned from the dominant Congress Party on the ground that it was unwilling to enact enforcing legislation for its social provisions

W. NORMAN BROWN

University of Pennsylvania

NANAVATI, MANILAL B., and C. N. VAKIL (Eds.). *Group Prejudices in India: A Symposium.* Pp. 223 Bombay: Vora & Co., 1951. $3.00.

Indian society is one of the most complex in the world with its Hindu caste groups and its many other divisions along religious, regional, and linguistic lines. Latent hostilities between many of these groups have been brought out by self-government. The twenty-nine essays in this volume represent a pioneer attempt to describe the serious consequences to an independent India of these tensions.

The authors of the various articles represent a wide variety of university professors and government officials They write out of a deep concern for the success of India's new government. A tone of urgency and a desire for immediate reform run through their writing. The editors reflect this spirit in their preface. "All thinking people would agree that the early removal of the prevailing group prejudices in the country is an essential preliminary for moulding free India into a united, strong and democratic nation."

The Indian Constitution contains detailed prohibitions against discrimination on grounds of "religion, race, caste, sex, place of birth." Discrimination is forbidden in public places such as shops, restaurants, places of entertainment, wells, bathing ghats, and temples. These constitutional provisions, though not universally enforced, are outlined by Professor Venkatarangaiya in his article, "The New Constitution and the Removal of Group Prejudices." This essay, however, is brief and general in character, which is true also of the other articles in the book.

This volume is significant in showing the increasing awareness in India of the social and political consequences of group antagonisms. But the authors in their desire for rapid solutions limit themselves to rather elementary and superficial programs, such as the creation of a central university, a national language, higher standards of living, educational reforms, and moral appeals. There is little realization of the extreme complexity and durability of group attitudes. The authors are not familiar with American research in the field of minority groups and culture prejudices. The essays were written before the United Nations Educational, Scientific, and Cultural Organization (UNESCO) studies of group tensions were initiated in India.

The book has no index.

PAUL F. CRESSEY

Wheaton College
Norton, Massachusetts

SLAVIC COUNTRIES

ZAVALANI, T. *How Strong Is Russia?* Pp. 244. New York: Frederick A. Praeger, 1952. $4.00.

This book is an attempt by an Albanian former Communist to assess the successes and failures of the Soviet Five Year Plans. His verdict is almost wholly negative. "The main lesson of Soviet economic planning," he believes, "is to teach us how it should not be done." The Five Year Plans, as he demonstrates, have been pushed home to the accompaniment of mass murder, starvation, forced labor camps, inflation, shortages of consumer goods, and the strictest kind of labor discipline. Given the shortage of skilled labor, they have also been marked by appalling waste and inefficiency.

All this is true, as any serious student of the Soviet Union knows, but it would probably be a mistake to conclude that the Soviet economy is as weak as Mr. Zavalani seems to think. The severest test of the Soviet economy to date was of course the war against Germany. Confronted with the indubitable fact of Soviet victory in this war, Mr. Zavalani attributes it to Hitler's mistakes, to Lend Lease, and to the poorly developed state of Soviet communications (which according to him hampered the Germans more than it did the Russians). He pays tribute to the fighting qualities of the Russian soldier, but this concession is hardly an adequate corrective to his mistakes. His view coincides almost exactly with that of a group of former German generals, led by Halder, who are busily explaining to anyone who will listen that the war was lost through no fault of the German General Staff.

Actually, the Five Year Plans provided the Soviet Union, however brutally and wastefully, with the industrial basis for fighting a major war, something Imperial Russia did not have in 1914–17. The best explanation of the Soviet victory, and the best corrective to the optimism which Mr. Zavalani's excessively negative analysis of Soviet economic planning may inspire in the unwary, is to be found in *Soviet Arms and Soviet Power* by General

Augustin Guillaume, a distinguished French officer who served as French Military Attache in Moscow after the war:

"Unity of doctrine, whether realized in enthusiasm or imposed by power from above—unity of direction in the political, economic and military domains insured by the strong personality of Stalin, chief of the Party, chief of government, chief of the armies—with the absolute authority and stability of power insured by dictatorship—amplitude of preparation, industrial and military—application without reservation, once the time had come, of the total human and material resources of the immense country—furious work by a great people under an inflexible discipline—the quality of military cadres insured by rigorous selection—the quality of military units based on strength of manpower and on a carefully sustained morale—and a material strength that was constantly increased and improved—these were the sources of the Soviet victory."

Mr. Zavalani has failed to make use of a number of good postwar works on Soviet economic development, such as the writings of Naum Jasny and Harry Schwartz. These, as well as others dealing with important noneconomic aspects of the Soviet state, ought to be consulted by anyone attempting the difficult task of answering the question posed by the title of this book. A full answer to this question, I fear, would give the Soviet rulers and their economic planners, however regretfully, higher marks than Mr. Zavalani has been willing to allow them.

HAROLD C. HINTON
Georgetown University

SCOTT, ANDREW MACKAY. *The Anatomy of Communism.* Pp. xiii, 197. New York: Philosophical Library, 1951. $3.00.

Dr. Scott has here performed a valuable service to all students of international affairs by the preparation of this objective, accurate, and critical study of the theory and practice of Russian communism.

The Anatomy of Communism begins with a critical analysis of the Marxian background of contemporary communism, and an appraisal of the Marx and Engels theory of the materialistic conception of history and the class struggle. This section is followed by a careful documentary study of Bolshevik tactics from the beginning of the twentieth century to the present time, as developed by Lenin and Stalin, and as carried out by the Soviet dictatorship.

During the last decade or so, there have been many students of communism who have been bitterly critical of Stalin and his rigid, dictatorial regime, and yet who have had many words of praise for Lenin. If only Lenin were alive today, they have declared, the Russian dictatorship would by now have taken long strides toward a democratic form of government.

Dr. Scott, in quotation after quotation, shows that it was Lenin who laid the foundation for the Bolshevik *coup d'état,* the Stalin dictatorship, and the Machiavellian tactics to which the communist movement has adhered since its beginning.

The author calls attention to Lenin's advocacy not only of dictatorship in general, but to his justification of *one man* dictatorship during a transitional period. Thus, in answering the question as to whether the will of a single individual, a dictator, may fulfill the will of the working class, Lenin is quoted as saying [Lenin, *Selected Works,* Vol. VII, pp. 341–2]:

"The question [of one-man dictatorship] has become one of really enormous significance. First, the question of principle, *viz.,* is the appointment of individual persons, dictators with unlimited powers, in general compatible with the fundamental principles of Soviet government? . . .

"The irrefutable experience of history has shown that in the history of revolutionary movements the dictatorship of individual persons was very often the vehicle, the channel of the dictatorship of the revolutionary classes. . . . Hence there is absolutely no contradiction in principle between the Soviet democracy and the exercise of dictatorial powers by individual persons."

The author likewise shows how Lenin evolved the concept of Russia as the "Socialist fatherland," to which Communists not only of Russia but of all lands should give chief allegiance in time of conflict.

Dr. Scott ends with a suggestive chapter on "The Great Illusion." Russian communism, he concludes, is "a whole fabric of illusions. . . . The responsibility for the fabrication of the majority of these illusions belongs to Lenin, and the ease with which they won wide acceptance is explained, in part, by an illusion having to do with Lenin himself—the idea that he was devoted to freedom and welfare for the working people of the world."

The reviewer, while finding Part I on early Marxian theories suggestive, feels that the author's treatment of the class struggle and economic interpretation of history in this section is too brief to permit of an adequate and well-balanced presentation. Those portions of Part I which are essential to the discussion of communism this reviewer feels could better have been woven into various chapters in Part II on communism proper. On the whole, however, the reading public should be grateful to the author for this clear and thoughtful contribution to the real nature of the contemporary communist movement.

HARRY W. LAIDLER

League for Industrial Democracy
New York City

HARE, RICHARD. *Pioneers of Russian Social Thought: Studies of Non-Marxian Formation in Nineteenth Century Russia and of Its Partial Revival in the Soviet Union.* Pp. viii, 307. New York: Oxford University Press, 1951. $4.50.

The revolutionary history of Russia is as full of paradoxes as it is full of interest. The central paradox is brought to light by the interesting study of Mr. Richard Hare. The West hardly knows that the radical idealistic movements of Western Europe and America about the middle of the nineteenth century had a parallel in a similar trend in Russia, one equally imbued with social humanism and equally fertile in ideas for reform. At the same time, as Mr. Hare's individual studies show, the Russian reformers were driven more and more upon themselves. While the Western trend was internationalist and, whether liberal or socialist, was concerned wholly with the urban class, the Russian trend developed a strong Slavophile outlook and a social philosophy, which came to be known as populism, centering on the peasant. That distinction became sharper with the rise of Marxian "scientific" socialism. The Russian reformers called themselves socialists, but most of them rejected the doctrine and implications of Marxism, which in the East was at best an alien importation.

Altogether the rigidity of the Marxist dogma was distasteful to the way of thinking of the bulk of the Russian revolutionaries. Chernyshevsky, for instance, wrote that to talk about natural economic laws made very little sense, nor need what is natural be any recommendation (p. 187). And Herzen, who met Marx in London and came to dislike him heartily, and in a way the ablest of them all, is quoted by Mr. Hare as follows: "I am not a bit frightened of the word 'gradualness,' wretchedly debased though it has been by the unsteady shaky steps of various reforming governments. . . . One learns mathematics gradually, so why should final conclusions and thoughts about sociology be spread like an epidemic of smallpox, or abruptly injected into the brain like medicine forcibly poured down a horse's throat?"; and he added that "to tell all that to the people we live among, demands if not more, at least as much courage and independence as it does to pursue extremes in everything" (pp. 267–68).

The Russian revolutionaries certainly did not lack courage or the spirit of sacrifice. There was always among them however this division between Easterners and Westerners, with the small Marxist group leading the latter. Since the late twenties especially, Soviet policy has completed the circle of paradox. The Communists had taken over a Western theoretical product which proved so arbitrary that, to apply it effectively, they have had to cut themselves off from the West and to act in the way which the Easterners claimed to be inevitable. Whether Soviet communism is truly Marxist or not is for Marxists to decide; but it is patently a highly nationalistic and isolationist policy in the extreme Slavophile tradition. Mr. Hare adds the point that the new Soviet state links up with the despotic czarism of

Peter the Great and Ivan the Terrible, not with the semiliberal reformist czarism of Alexander II (p. 302).

Mr. Hare has given us a highly interesting study of social thinkers whose lives and works are hardly known in the West. The writing is not always in the same class as the scholarship; and for a volume of disconnected studies an index of names is woefully inadequate.

DAVID MITRANY

Oxford, England

Soviet Legal Philosophy. Papers by V. I. LENIN, P. I. STUCHKA, M. A. REISNER, E. B. PASHUKANIS, J. V. STALIN, A. Y. VYSHINSKY, P. YUDIN, S. A. GOLUNSKII, M. S. STROGOVICH, and I. P. TRAININ. Translated by HUGH W. BABB, with an introduction by JOHN N. HAZARD. Vol. V in "20th Century Legal Philosophy Series." Pp. xxvii, 465. Cambridge, Mass.: Harvard University Press, 1951. $7.50.

This volume is "a chronicle of the steps taken in the formulation of a Soviet legal philosophy" (p. xvii). It contains a short lecture delivered by Lenin in 1918 entitled "The State," excerpts from the writings of two legal theorists of the twenties (Stuchka and Reisner), the famous book of Pashukanis on "The General Theory of Law and Marxism" (3rd edition, 1927), two short selections from Stalin indicating the crisis in Soviet political theory in 1929–1930, the 1930 speech of Pashukanis in which he succeeded in bringing his theories through the crisis almost intact, the denunciation of Pashukanis and others by Yudin in 1937 and the more extensive refutation by Vyshinsky in 1938, a short excerpt on the theory of the state from Stalin's 1939 report to the Eighteenth Party Congress, and about 100 pages from Soviet writings of 1940 and 1945 on the theories of the state and of law.

As a supplement to the literature in English on Soviet law (some half-dozen books), this anthology is most useful. However, the reader who is not familiar with the concrete legal developments in the Soviet Union over the past 35 years will be misled if he takes the present volume as a guide to what Soviet jurists have really thought about law. This is not to say that the writers here represented are attempting to deceive anyone, but only that their theories are constructed primarily for the sake of meeting certain practical problems faced by the Soviet state and not primarily for the sake of the truth. Soviet legal theories may be analogized to legal fictions, which are not meant to be believed or disbelieved but which are designed as a means of developing the law. The practical implications must be read—where Soviet eyes are accustomed to read—between the lines.

Taken simply as a series of essays in legal and political philosophy, the present volume has considerable interest. Perhaps its chief merit is that it presents Pashukanis for the first time in English. Pashukanis was a profound legal philosopher, who dominated Soviet jurisprudence (and in some respects Soviet legal development) for some 20 years. His theories were, however, disastrous for the actual development of Soviet law, since he believed that law was based essentially on the market and on the principle of reciprocity or exchange, and that hence in a socialist planned economy law represented a bourgeois survival which should be used, if at all, simply for political purposes. Vyshinsky, with less profundity, but with more common sense, opposes the reduction of law to either politics or economics.

HAROLD J. BERMAN

Harvard University Law School

Hoover Institute Studies, Series B: "Elite Studies," Nos. 1, 2, and 3. Stanford Calif.: Stanford University Press. No price.

No. 1. LASSWELL, HAROLD D., DANIEL LERNER, and C. EASTON ROTHWELL. *The Comparative Study of Elites: An Introduction and Bibliography.* Pp. iii, 72. 1952.

No. 2. SCHUELLER, GEORGE K. *The Politburo.* Pp. vi, 79. 1951.

No. 3. LERNER, DANIEL, with ITHIEL DE SOLA POOL and GEORGE K. SCHUELLER. *The Nazi Elite.* Pp. x, 112. 1951.

These booklets open a series devoted to the study of leadership groups as part of a wider exploration of the "world revolution of our time." Whether or not God deigns to chuckle over so full a phrase, its use could hardly detract from the value of scientific inquiry into what is here called "elites." Lasswell recommends the concept as covering "both the leadership and the strata from which leaders usually come." Elites, it is asserted, exist in democratic as well as nondemocratic societies. The leadership groups are thus an inviting object of political analysis.

This idea itself is not unfamiliar. But it cannot be said that much capital has been made of it up to now. The significance of the new series lies in the systematic presentation of basic biographical data about the body of individuals who form or have formed particular elites. The results are a welcome enrichment of political science, both in broadening the empirical base of knowledge and in elaborating a useful methodological approach. The planners of the series and the individual authors deserve the gratitude of all those who seek to come to grips with the elusive essence of the political process.

This is where a brief review might end, ignoring the temptation to show the able authors less than right on particular points. But perhaps they will not mind if some words are added about the limitations that inhere in studying elites on the basis of a *Who's Who*. One thing such study leaves in the dark is the vital matter of internal relationships, above all the lines of effective communication within the elite as a general chart of power and status. Another thing that remains obscure is the relationship between different elite formations in one and the same society. This interplay of different elite formations can be observed even in societies where the supremacy of a particular elite formation is formally acknowledged.

More than ten years ago I suggested the possibilities of getting at the operating realities of totalitarian systems by examination of the "interaction of different hierarchies" within each system. Perhaps it is the focus on membership characteristics that carries into Scheuller's sketch of the Politburo and Lerner's sifting of the Nazi leadership an excessive implication of structural unity, despite the cautions sounded in the introductory discussion of the elite concept.

The set of mirrors so shrewdly employed in this series to look over forbidding walls provides us with intriguing perspectives, but leaves us still guessing at the whole story. One would hope for equally careful experimentation with additional approaches to increase the yield in a field of study that holds great promise.

FRITZ MORSTEIN MARX
American University

FEHLING, HELMUT M. *One Great Prison: The Story Behind Russia's Unreleased POW's.* With a foreword by KONRAD ADENAUER and JOSEF CARDINAL FRINGS. Translated from the German by CHARLES R. JOY. Pp. xvi, 175. Boston: The Beacon Press, 1951. $2.50.

The sordid story of the mistreatment of war prisoners, the infliction of penal servitude upon the soldiers of vanquished powers, keeping them from the home circle years after the end of hostilities, needs to be told as often and as fully as possible. Nowhere have reparations in human chattels attained such proportions or continued so long as in the Soviet Union, although France strove mightily, within the limits of her reduced capacity, to compile a record of shame, and the United States emerges with anything but clean hands.

Unfortunately, this little book by a German war captive is not an effective indictment of the Soviet record. It is in no sense a study of the problem, but merely a sketch of personal experiences, a relation of horrors in which incidents crowd upon each other with so little explanation as to leave the reader with a confused impression of everything except the nature of the Soviet regime. Less striving for literary effect and more down-to-earth reporting would have strengthened the author's message without detracting unduly from the interest of his narrative.

Embitterment over treatment that will shorten his life and has already claimed that of many of his fellows naturally disposes him to lump people and regime together in one sweeping condemnation—a common failing of our day, and one to which the author's own countrymen have fallen victim. Yet on occasion he succeeds in being fair to the Russian people. The story of the elderly woman physician (p. 54), whom "the hard soil of her homeland will soon cover" because of her devotion to the consumptive prisoners confided to her care, is deeply moving, and more than once an acid comment is made about the German character and a grudging tribute paid the Russian. There is unhappily little reason to think that Fehling has exaggerated conditions; as in the case of other accounts of life in the Soviet Union, the reader will not be able to decide whether cruelty or callousness is the more terrible aspect of Soviet rule, and whether prisoners of war fare any worse than native Russians who have somehow run afoul of this all-embracing system.

The second half of the book presents a useful compilation of documents, notes, and pronouncements regarding the war prisoners issue; when one emerges from the maze of conflicting statements, one is left with the feeling that nothing is certain except that large numbers of prisoners have perished in the Soviet Union and many are still detained despite official assertions to the contrary. Some day a definitive indictment may be drawn; this book does not do it, and it is obvious that it cannot be done at the present time.

OLIVER H. RADKEY
University of Cincinnati

KRYLOV, IVAN. *Soviet Staff Officer.* Translated by EDWARD FITZGERALD. Pp. vi, 298 New York: Philosophical Library, 1951. $3.75.

Some of the most pertinent questions of the day regarding the Soviet Union find elucidation in the conversations and experiences recorded by Captain Krylov. Are there real differences of opinion in the Politburo? What are Stalin's relations with the Politburo, with the Army? How far is Soviet policy determined by Communist dialectic, and how far by Russian historical aspirations? What is the nature of dissidence in the Party and among the people?

The author begins his story in the spring of 1940. Germany and the Soviet Union had partitioned Poland, and all the Powers except the United States were sparring for the most advantageous positions in the imminent great war. Krylov, as a staff officer with experience as military attaché abroad, a knowledge of French, German, and English, and membership in the Party, enjoyed the sharing of information and misinformation which took place at embassy functions and within the Party elite. Voroshilov invited him to a conference Marshal Shaposhnikov was his sponsor and hero. As aide to the latter he attended a Kremlin top-level meeting of Politburo and General Staff members, with Stalin presiding, to decide between Shaposhnikov and Budenny on battle strategy. Because of an indiscretion, he was reduced to the ranks. He fought at Poltava, was wounded, decorated with the Order of Lenin, and regained his commission and place in military and political planning. He participated in a "circle" of army officers working for a palace revolution which would substitute the army for Party dictatorship. As a result of wartime acquaintance with peasants, the Cossacks, the Ukrainians, and the Soviet intelligentsia, but particularly in consequence of his study of Russian history, Krylov's convictions led him to shift to another dissident group, which dreamed of a Russian republic with free elections and justice for all.

Stalin appears as a shrewd manipulator rather than as a personal dictator. He draws out the members of the Politburo, seeming to enjoy their personal antagonisms; then, with his secretary, he works out a resolution which constitutes a synthesis for general acceptance. More than once have we learned from "inside" stories that Stalin turns to religion at critical moments. Krylov reports that at the signing of the treaty with Yugoslavia on April 6, 1941, Stalin said to Gavrilović, "We are brothers by blood and religion." As the party was breaking up, "Stalin went up to Gavrilović, shook him by the hand and then, before turning to go, made the sign of the cross in the Orthodox manner . . . as though he were blessing the Yugoslav Minister."

When the war was at its height, the Soviet people became vocal in their hope that "everything will be different" with peace. They "expected political changes, the dissolution of the NKVD, free elections for the Supreme Council without intimidation by the local authorities, and the institution of a second party side by side with the Communist Party to get rid of the dictatorship. . . . Pamphlets were printed for civilian consumption explaining that 'the normal regime will consist of two parties. the Communist Party for the workers in the town, and a Peasant Party for the workers of the countryside.'" But, as victory drew near, the Communist Party resumed its grip, stifled free expression, astutely and mercilessly combined Communist dialectic method with Russian historical aspirations to set the stage for the greater conflict yet to come.

Most of the book is written in the form of conversation. This is a good style for enlivening, sharpening up, and personalizing the record, but it is of doubtful advantage in a field where accuracy is essential. Yet there is a ring of sincerity and authenticity throughout. Krylov's first hand reports on high level conversations are revealing, but his book is more valuable as the autobiography of a reasoning person in an unreasonable society. How many Krylovs are there in the Soviet Union today? PAUL B. ANDERSON

International Committee of Y.M.C.A.
New York City

WESTERN CONTINENTAL EUROPE

ZURCHER, ARNOLD J. (Ed.). *Constitutions and Constitutional Trends Since World War II: An Examination of Significant Aspects of Postwar Public Law with Particular Reference to the New Constitutions of Western Europe.* Pp. viii, 351. New York: New York University Press, 1951. $5.00.

This work is a symposium of timely contributions by specialists in their respective fields: Carl J. Friedrich, "The Political Theory of the New Democratic Constitutions"; Edward G. Lewis, "Electoral Changes after World War II" and "The Position of the Representative Legislature in the Postwar Constitutions"; Joseph Dunner, "Stabilization of the Cabinet System in Western Europe"; Ferdinand A. Hermens, "Local Autonomy in France and Italy" and "Functional Autonomy after World War II"; John Brown Mason, "Federalism—The Bonn Model"; Adam B. Ulam, "The British Commonwealth as an Example of a Multinational State System"; and Robert G. Neumann, "Constitutional Documents of East-Central Europe."

These contributions are treated by Karl Loewenstein to an engagingly piquant rationalization under the all-too-modest title, "Reflections on the Value of Constitutions in Our Revolutionary Age." Editor Zurcher's introduction constitutes an able survey of the contributors' special studies, including Professor Loewenstein's Reflections. The book concludes with the texts of the constitutions subject to study; the Statute of Westminster, 1931; Communiqué and Declaration of the Commonwealth Prime Ministers' Conference; the Statute of the Council of Europe; and a useful index.

Within the space allotted, only a few over-all observations are feasible. The conception that constitutions, particularly democratic versions, would prove to be the simple and infallible cure-all for the ills of nineteenth- and twentieth-century politically organized society has received a rude shock. The hope that progressive modifications of such constitutions, dictated by changing internal and international exigencies, would eventually produce a workable functional mechanism suitable for the realization of basic moral, social, and political principles, has not fared better. Such hope has given way to the disturbing discovery that the more one changes, the more one is forced to change—an inevitable price to pay for the unpredictability of men, democratic or otherwise.

Some of the contributors see the shortcomings of democratic constitutions and functional processes in the failure to meet the problem of the modern democratic party state, the absence of agreement on party values, and the lack of social and moral unity in the community. The reviewer suggests that tackling the problems cited by the contributors requires in the last analysis a coming to grips with the lack of moral, social, and political values among the citizenry at large, from which individual membership in parties, parliaments, and public administration issues.

The terms "moral" and "values" are used, without definition, as applied by the contributors, presumably in the meaning of the golden rule.

JOHANNES MATTERN
The Johns Hopkins University

DUVERGER, MAURICE. *Les Partis Politiques.* Pp. x, 476 Paris: Librairie Armand Colin, 1951. 100 fr.

In view of the importance of political parties in the contemporary world, astonishingly little is known about their internal structure, their comparative anatomy and the general principles that condition their development and influence. M. Duverger's book is an important pioneer work in this field. After a brief account of the historical origins of parties, he turns to the heart of the matter. His examination of structural problems, perhaps his most original contribution, includes the originating impulse, whether within or outside of the parliaments, the role of the inscribed members, militants, sympathizers, and voters, the ways of selecting the leaders, their power and relationship to the parties' parliamentary representatives. The second half of the volume deals with party systems, single, biparty, multiple-party, party alliances, and relationships with public opinion and governments. Numerous charts illustrate the text, and the conclusions are presented in a final chapter

M. Duverger has an extraordinary knowledge of the political scene in many countries, overseas as well as in Europe. Examples shift with dizzy speed from one country or continent to another. Only the Far East and Spain are missing, while French experience is perhaps cited most frequently Familiar with the technical literature in the important western languages, the author seems to have studied many problems at first hand and to have consulted the appropriate experts. Aware of the many gaps in his information, he repeatedly identifies his conclusions as tentative in character, and speaks of the development of a science of political parties in perhaps fifty years. That future researchers should ask the right questions is the most urgent need, and the author believes that he has formulated them.

These warnings notwithstanding, this book presents a remarkably integrated theory of parties, only one phase of which can be mentioned here. To say that M. Duverger regards the internal structure of parties as the key to all other problems would be unfair, for he attributes much influence to methods of voting (majority or proportional representation) and to party programs But the trend of his thought lies definitely in that direction. In his opinion, the mass party, founded at the turn of the century by the Socialists, is here to stay with permanent local organizations of various types (including Communist cells and Fascist action squads) integrated vertically under powerful leadership. The United States is about the only exception. While all parties are oligarchical in character, they are becoming increasingly authoritarian under the influence of the mass parties. They form more than they reflect public opinion. M. Duverger nevertheless accepts the party system as indispensable and as justifiable. On the basis of the Turkish experience, he even sees the one-party system as an instrument of progress toward democracy in Asia but not in the Soviet Union where it has become a permanent organ of the state. In general, he values parties, not as an assurance of government "by the people and for the people" which he regards as impossible, but as a means of drawing leaders from the people.

E MALCOLM CARROLL
Duke University

SCOTT, JOHN A. *Republican Ideas and the Liberal Tradition in France, 1870–1914* Pp. 209. New York: Columbia University Press, 1951. $3.00

According to Dr. Scott, French republicanism has been characterized by its opposition to the monarchical principle as "irrational and archaic," by the secular spirit which pervades it, by political democracy in a national state, and finally by a "deep concern for the social question." "From the beginning," says Scott, "the word republic has represented to millions of Frenchmen a social as much as a political ideal" (p. 18).

Contrary to James Bryce, the author does not believe French Republican democracy sprang suddenly into being in the eighteenth century. It, he thinks, dates back as far as the Reformation, if not farther, and was the result of generations of struggle against absolutism. Except for some very brief mention of Fénelon, Pierre Bayle, and Jurieu, he makes no attempt to illustrate or prove this important point. Instead the major part of his 44-page introduction is taken up with an interesting discussion of the ideas of the French philosophers of the Enlightenment and of the Girondists and Jacobins so far as these apply to his theme.

The main part of the volume deals first with the republican theories of a nineteenth century Gironde, in two chapters dealing with Charles Renouvier and the philosophic liberals and with Émile Littré and republican sociology, and second with what are termed the Neo-Jacobins, this section likewise subdivided into two chapters—on Clemenceau and the Radical party and on Solidarité, an official philosophy.

Renouvier, says Dr. Scott, took the Girondist tradition of the eighteenth century, too narrowly political to suit the advancing times, and "developed it to meet the special problems raised by the coming of the industrial age" and early socialism.

Littré, while advancing liberal republicanism still farther by his philosophical writings and his membership in parliament, gave a practical bent to its existence To him, it must rely on the liberal bourgeosie and the peasantry as against the extremes of the Right and the Left. To accomplish its purposes it must advance a policy of national education, social conciliation, and protection of peasant rights.

Perhaps Clemenceau, whose family was thoroughly Jacobin in background, with the family residence "cluttered with pictures of Robespierre, Saint-Just, and other great Jacobin heroes," is most interesting of all both in the vicissitudes of his career and in his personality. He was present in America at the end of the Civil War and in Paris during its siege and the Days of the Commune; he became the champion of popular rights and of the Republic in parliament, the leader of the radical group which held the parliamentary balance of power, first as the workers' spokesman in parliament, and then in fierce opposition to the workers' contention that war in 1914 would be a crime which they must unite to oppose, he strongly advocated *revanche* towards Germany and *rapprochement* with England; and finally he is distinguished by his role as indomitable war dictator in 1917.

In his ideals Clemenceau especially advanced the "concept of the Republic as a lay state." It never could be secure as long as state and church were officially combined. The church must be driven out of politics since in the past the state had been "submerged by successive waves of royalist and clerical reaction." Purged of the influence of royalists and of the church, France should enjoy a stable, democratic regime, while the carrying out of peaceful social reform should satisfy the proletariat and make future revolutions unnecessary.

This latter idea was in accord with Solidarité, the official philosophy founded by Alfred Fouillée and further developed by Léon Bourgeois. "The aim of Solidarité was not social equality, the abolition of capitalism, and the inauguration of socialism. Solidarité stressed the necessity of maintaining the existing bases of society, of making only those social concessions that would avert the danger of revolution" (p. 176). Neither, as Bourgeois saw it, was it state socialism as in Germany. "The state should not interfere in economic life to the extent of challenging or regulating the productive process or the employer-labor relationship" (p. 177). While avoiding both laissez-faire liberalism and revolutionary socialism" it provided a formula for the amelioration of glaring social abuses, while maintaining untouched the existing bases of capitalist society in private property and freedom of business enterprises" (p. 178) It became a philosophical guide for the leading republican intellectuals It was taught in the schools, became the topic of many articles and speeches, and Solidarité was accepted in the assembly as the promoter of public assistance and social hygiene laws. It became by 1914 "the dominant philosophy of the Third Republic" (p. 179)

It may be said in conclusion that this volume of the Columbia Studies in History, Economics, and Public Law is well organized, well written, and thought provoking

JAMES E. GILLESPIE
Pennsylvania State College

WIESE UND KAISERWALDAU, LEOPOLD MAX WALTER VON. *Gesellschaftliche Stände und Klassen.* Pp. 85. Bern, Switzerland: A. Francke, 1950 No price

Dr. Leopold von Wiese of the University of Cologne, Germany, whose seventy-fifth birthday is being celebrated by his admirers in the field of social philosophy, gives in his recent study of functional and social classes an interesting insight into German scientific thought In his brilliantly written book the problem of what determines class membership is historically developed.

Professor von Wiese begins with the "karnine" social system of Blut, where the functioning group is based upon blood ties —the period of Nomadism Then he describes the "domine" social system of Boden (settlement on land) with its natural consequences of war and conquest, warrior and leader, slavery and serfdom—the period of feudalism *Reiten und Rauben ist keine Schande; das tun die Besten im Lande* To ride and to rob is no disgrace; it's done by the best in the land. This system of feudalism is followed by the institution of craft and merchant guilds, patriciate, and township in the "merzine" period of commerce. The ensuing Industrial Revolution produced the "artine" type through technology. The social hierarchy, based upon a differentiating system of values, especially of "individuation"—evaluation of the individual according to his qualifications, social heredity, and economic income, leading to *Klasse*—is historically preceded by the functional class of occupation and profession—*Stand* The principal of individuation has been replaced in the European sphere of culture by the class struggle in Marxian sense between proletariat and proprietor, which, according to the author, eventually created a system of five classes: the impoverished; the labor class; the small capitalists; the well-to-do; and the plutocrats. Today, after the collapse of National-Socialism, Professor von Wiese sees six classes in Germany. the uprooted (some 15 million expellees, who cannot find a niche in *Klasse* or *Stand*); the old and disabled; the intellectuals; the laborers and employees; the small entrepreneurs and farmers; and the monopolists of coal, iron, textile, and chemical industry, who, however, do not represent the capitalists of the old style, but rather a kind of black or gray marketeers of scarce goods—a moral result of the national disaster.

His book ends with an interesting outlook into the future stratification of society. This last chapter must be especially provoking to a man who spent the first half of his life in German intellectual climate and thereafter has studied American social philosophy for more than a decade in this country.

Von Wiese's rejection of communism as a farce of classlessness and socialization of thought will be generally shared here However it seems to this writer that the author's blueprint of an ideal society of the future is already reality in the United States today, even in view of much criticized exceptions. Von Wiese's general premise of social stratification is the assumption of hereditary inequality, biologically as well as socially, which consequently and inevitably leads to the hierarchy in social structure. In this connection he thinks of natural inequalities of talent, genes, of mental, emotional, and physical potentialities. As a distant goal, the author visualizes social freedom from limitations, selfishness, and enmities—equality on a higher level. The near goal should be a social structure in which the different social levels come closer to each other through higher general culture and higher standard of living.

In order to understand von Wiese's argumentation, it should be remembered that deeply anchored in the German mind, historically conditioned in a feudal social order, along with heel clicking in the presence of a member of a "higher" class, is the conscious or subconscious thought that the "higher" class is the socially more valuable one. It is somewhat difficult to disregard the impression that the author is more a student of the French and the Bolshevist Revolutions than of the American Revolution of 1776. Because what are sketched by von Wiese as distant and near goals for an ideal society of the future have become or are in the process of being definite reality in this country While even Great Britain had legal class privileges until 1945, privileged classes are legally unknown in the United States. The privileged class of nobility and aristocracy has been abolished in this country since 1776. The social distance between individuals here is recognizably smaller. The greater accessibility of the American of even highest functional class stems from the democratic attitude of equality Even if it must be admitted that there exists a certain rigidity of spatial boundaries within the more intimate central regions of personality, exemplified in exclusive clubs, this could probably be explained as a form of feudalistic atavism.

Lloyd Warner's economic class structure is not identical with European class consciousness, an attitude which separates the proletarian from the capitalist, the poor from the rich. We do not have here class hatred of Marxian vintage between the representatives of the lower economic classes, who do not think of themselves as proletarians, and the lower upper and upper upper classes. There is no deep enmity between capital and labor in the United States, because the well-to-do do not represent a "ruling" class of capitalism in the sense of Marx. American capitalism is not scheming to "exploit" labor, because labor is its best customer in a predominantly domestic market. In Europe political power always has been and still is caste or class power. American government is not partisan. The Democratic party is not the party of the poor, and the Republicans are not the rich—the coal miners' boss Lewis is a Republican. American government has to defend the rights of labor as well as those of capital in order to remain in office. In spite of numerous exceptions, it is American tradition to chose the white man according to his ability rather than according to his pedigree.

Von Wiese's immediate goal of social structure, in which the different social levels would come closer to each other through higher general culture and standard of living, seems to have been achieved here through our high income and inheritance taxes which are closing more and more the gap between rich and poor, and through our vastly improving general educational system which lifts the individual to a higher cultural *niveau* All the rich, according to the author's dream of a future society, should feel themselves as trustees of funds used in general and public interest. The numerous private foundations for research in our country are ample proof that these dreams are reality in the United States. Classlessness in von Wiese's opinion (page 82) is equivalent to communism. However our own tax and educational system seems to lead to a somewhat real classless society on that higher level von Wiese speaks of. But it certainly will not be communism.

Only once, in the last sentence of his book, is American culture mentioned—in a negative sense. It confirmed for this writer how little understood our social philosophy is in Germany.

ROBERT SCHARF
Georgia Institute of Technology

EINAUDI, MARIO, JEAN-MARIE DOMENACH, and ALDO GAROSCI. *Communism in Western Europe* Pp. ix, 239 Ithaca, N. Y.: Cornell University Press, 1951. $3.00.

This is a most useful piece of research on the political strategy and tactics, on the organization and strength, on the historical evolution, and on the present prospects of communism in what the authors insist on calling Western Europe, but which is actually only a part, though an important part of it—France and Italy. Neither the Low Countries, Western Germany, Switzerland, nor Austria is examined, not to speak of Great Britain and Scandinavia. This equation of France and Italy with Western Europe is not only a bit parochial but in the present context actually misleading, because it suggests that the conditions discussed in the book are typical of all of Western Europe, whereas in fact in other sections west of the Iron Curtain conditions are extremely different, and the reasons why this is so would merit careful comparison.

On the other hand, the authors are justified in lumping France and Italy together for the purpose of their present study, more so than was Einaudi in describing their constitutional systems together in the collective text on *Foreign Governments* edited by F. Morstein Marx, a feature wisely abandoned in its second edition. For, while the constitutional systems of the two countries are very different, their situation with regard to communism is indeed strikingly alike.

In the full and accurate analysis of this situation the book represents good workmanship of able political scientists, intent on facts first and interpretation next. Jean-Marie Domenach, member of the French Resistance and editor of a periodical dedicated to Catholic thought, presents the French Communist party in some 90 pages; Aldo Garosci, of the Italian "Justice and Freedom" movement, its Italian counterpart in about an equal space; while Mario Einaudi draws general conclusions in a fine 60-page introductory chapter.

Most illuminating are the precise details given on organization and tactics, especially on the cells and their efficient control from above through the inhibition of cross contacts among them; the flexible use of expansive and contractive methods; the simple devices applied in winning domination over other groups that have been allured into some joint front organization or bloc; and above all the analysis of the reasons why people of obviously non-Communist convictions have so generously given their votes to the Communist party in both countries, which they failed to do, for example, in Western Germany or Norway. The role played by trusted, and in the general sense of the term integer, personalities in Communist activities is well illustrated by sketches part caricature and part idealization, which are offered of the leading Communists.

Unfortunately, nonprofessional readers will not readily turn to a book like this which is both difficult to read and bare of sensational coloring. If they did, they would better understand what is going on this side of the Iron Curtain, what the dangers are of ignorance in dealing with an adversary like Communism, and the overpowering importance of positive rather than negative measures in the cold war.

ARNOLD BRECHT

New School for Social Research

GALENSON, WALTER. *The Danish System of Labor Relations.* Pp. xiii, 321. Cambridge, Mass.: Harvard University Press, 1952. $4.50.

Having written *Labor in Norway* and *Rival Unionism in the United States,* Galenson is well prepared to analyze comparative differences and similarities in labor movements. The uniqueness of Danish industrial relations appears in part to arise from such features of the Danish economy as great dependence upon international trade, high relative importance of agriculture, the predominance of small-scale industry, and the existence of a sizable entrepreneurial group. Also a spirit of corporatism in all economic matters, a product of the easy absorption of guild traditions in a country which experienced no sudden industrial revolution, has had a profound effect upon labor relations. The result has been two powerful organizations of labor and industry whose equals in strength probably cannot be found anywhere. Yet under a highly centralized collective bargaining system these two movements have been able to live in relative peace.

This Galenson accounts for upon the basis of an interesting set of institutional arrangements which have grown out of the so-called "September Agreement" of 1899 which ended a nationwide lockout at that time. This agreement defined the position and acceptable tactics of the two groups. Over the years a system of voluntary collective bargaining and state mediators for the settlement of matters of interests and a system of arbitration boards and a labor court for deciding, and rigidly enforcing, matters of rights has been able to keep labor relations on a smoother basis than in such highly regarded "laboristic" states as Norway and Sweden.

Galenson find that Danish labor, while a part of a socialist movement which through coalition has controlled Denmark for several decades, has been far less interested in either socialism or economic planning than the English or other Scandinavian labor movements Its interests have centered in collective bargaining and welfare state policies. Today Denmark spends a larger percentage of its national income for welfare services than any other state in the world. The labor movement has also been distinguished by a decided cleavage between skilled workers organized largely in compound craft unions and a general union of unskilled labor which has about 40 per cent of total union membership. While the labor movement over a half century does not appear, upon the basis of limited statistical evidence, to have altered the distribution of income between labor and other groups, it does appear to have narrowed wage differentials.

Pressure for higher wages, backed by political power, is beginning, however, in Galenson's estimation to develop some cracks in the collective bargaining system which cannot deliver the desired goods in an economy disrupted by one war and clouded by another. Direct political intervention by Parliament is increasing in labor dispute settlements, and this may augur ill for the continuance of the unique voluntary centralized collective bargaining structure that has been built up.

Meanwhile Danish labor, while hobbling economic mobility and productivity with a rigid apprenticeship system, has shown great interest in increasing production through joint labor-management committees. It has also shown at all times unswerving allegiance to democratic procedures. "If there is any nation that can peacefully adjust the social conflict arising from industrialization, with equal regard to the welfare of the individual citizen, whether he be worker, farmer, or business man, it is Denmark."

In my opinion this book is the best example to date of a study that not only describes the labor relations system of a country, but provides a significant economic analysis of it in terms both of its impact upon the workings of the economy and of the extent to which the movement itself is a product of the peculiar economic problems of the nation. A. MORGNER

Texas A. & M. College

OTHERS

ZINKIN, MAURICE. *Asia and the West.* Pp. xii, 300. London Chatto & Windus (distributed in the United States by Institute of Pacific Relations), 1951. $3 50.

This lively book should be read by all who are interested in investment and trade in Asia, and in the problems that are created for investment and trade by the complicated political movements of Asia. The author was formerly a member of the Indian Civil Service and is now a representative in India of Unilever, a great British corporation that is active in many countries in both production and distribution. The introduction to the book is by Sir Geoffrey Heyworth, a director of Unilever.

There are some points in Mr. Zinkin's approach to the problems with which he deals that should be of special interest to Americans who are studying the same problems. Mr. Zinkin takes India as the geographical center from which he looks out at the rest of Asia, whereas the more usual American approach is through Japan or China. Mr. Zinkin was formerly an administrative officer of the greatest British imperial possession, and is now an executive of a great British corporation doing business in the same country, which has since become independent. This kind of combined experience is most exceptional in Americans writing about the problems of Asia.

Mr. Zinkin's Indian experience and

knowledge give a special edge to his analyses of other countries in Asia; but unfortunately no one man can be equally authoritative about all the countries of Asia. The fact that therefore some of his opinions are decidedly open to challenge, because of insufficient knowledge, must however be offset against the fact that his opinions are always interesting, because he has an open, inquiring, and original mind

For example, his statement that "it is very doubtful whether the Koreans were in the end any worse off because of Japanese rule" (p. 68) is certainly questionable; in fact, Mr. Zinkin himself provides the material for refuting this statement. With this statement may be contrasted the penetrating observation that politically British law and order in India "provided many of the concepts upon which the new free and liberal India is being developed," but that at the same time "economically it has been an almost unmitigated disaster" (p. 76)

Another statement that can be challenged is that "the most bankrupt countryside in Asia is the Chinese" (p. 111). It is this reviewer's opinion that the rural economy of India is more bankrupt than that of China

Probably the most interesting statement in the whole book, coming from a representative of risk capital, is that Asia, "outside the Communist area . . . is moving Right at about the same pace as Western Europe, and for very similar reasons" (p 287).

OWEN LATTIMORE

Johns Hopkins University

COATES, W. P, and ZELDA K. COATES *Soviets in Central Asia* Pp. 288. New York: Philosophical Library, 1951. $4 75.

The authors of this book seem very close to the Soviet scene; in fact they are so close that not a critical word is mentioned regarding Soviet policy or the method by which it is implemented. Part I, the first third of the book, is a short historical sketch of a region which has a very long history. A short review of S. N. Tolstov's work on the Khwarzin Culture is new and of interest in understanding the background of Central Asia. However, the main purpose seems to be to set up a picture of desolation, slavery, exploitation, and poverty in order that one may be properly prepared for the sharp contrast of the beneficent Soviet regime. The people of Central Asia had domesticated most of the plants and animals used by the Western World long before any Russian was known in these parts. Also, agriculture and cities were as early here as at Sumer. How about the great achievements in ceramics and textiles? In the realm of ideas, Zoroaster is barely mentioned. The authors speak of liberation in 1917, but is it liberation to have the control of your country shifted from czarist to Soviet rule?

The latter two thirds of the book (Part II) is similar in content to the *Soviet Weekly* and the *Information Bulletin* of the Soviet embassy. All photographs are taken from these sources. The authors state that they were recently in Soviet Central Asia, but no dates were given nor any word indicating under whose auspices they were able to travel there. Obviously they could not photograph freely, or we might have had the treat of a fresh photograph. There is little doubt that some progress has been made under the U.S.S.R., but it is difficult to understand how the land has changed from one of poverty and slavery to milk and honey in a span of twenty-five years. The tone of the book is such as to imply that now Utopia has been reached. The description of achievements in large desert Kazakhstan is the same as in small mountainous Kirgizia and in each case tells that kindergartens, hospitals, and "houses of culture" are everywhere, and that all are working as one happy family.

The author's conclusion is an attempt to refute all argument that forced labor exists in the Soviet Union. To quote the final paragraph: "Forced labour could never produce such widespread feelings of pride and loyalty to their regime. It is only because the peoples of these republics feel themselves to be free and equal citizens with all others in their country, because they feel that they themselves are the masters of their destiny, that their work in the fields, mines and factories is work for themselves, their families and the good of their own state, that they work with such enthusiasm, and that work in the U.S.S.R. is becoming more and more, in the words of the Turkmenian letter, 'a matter of honour, of glory, of valor and heroism.'"

Obviously, the many statistics in the book are official and must be assumed to be correct. The frequent mentioning of 8,000 kilowatt electric stations and 50,000-ton-capacity coal mines makes dull reading. In contrast to this favorable statistical picture the authors often say that "the sanitary conditions are very primitive but clean."

Soviets in Central Asia adds very little to what is already available in Soviet propaganda literature.

JOSEPH E WILLIAMS
Stanford University

RILEY, JOHN W., JR., and WILBUR SCHRAMM. *The Reds Take a City: The Communist Occupation of Seoul, With Eyewitness Accounts.* Narratives translated by HUGH HEUNG-WU CYNN. Pp. xiv, 210. New Brunswick: Rutgers University Press, 1951. $2.75.

This volume is a résumé of 90 dark days of terror when the Reds occupied Seoul, capital of the Republic of Korea.

The authors have set forth a realistic account of how the Reds moved into South Korea, not only with military weapons but with tons of leaflets, posters, propaganda materials, and complete dossiers on key Republic of Korea personnel marked for liquidation and of personnel trained to administer the municipal function of a large city.

The blueprint of Communist occupation shown includes a program which runs the gamut between the extremes of the "mailed fist" and the proverb, "One can catch more flies with honey than with vinegar." Thought control, propaganda of the big lie repeated through every medium of communication, attacks on the United States and on the former Republic of Korea, praise for the U.S.S R., arrests, "voluntary" confessions, trials, executions, lootings, people's courts, cultural meetings, and indoctrinations kept everyone busy every minute of the day and night.

The Reds even attempted to impose a number of long-overdue improvement programs such as higher taxes on business, land reforms, and the giving of more rights to women. However, from their point of view, and they never once lost sight of it, the elimination of the "reactionaries" was their main purpose, and they strove to achieve this objective throughout the entire occupation.

Clearly written by two university professors, the members of an American team of experts, the manuscript contains (1) sufficient background material necessary to understand the occurring events as well as (2) translations from personal eyewitness accounts and experiences of eleven representative Korean Democrats who survived the occupation and who by their dramatic and exciting stories reveal what may be expected by free people who are marked for liquidation or who are a part of the Democratic forces when the Communists occupy a city.

The personal experiences include stories of (1) a congresswoman who writes: "That night in a cell I tried to commit suicide by tying a stocking around my neck, but at the point of tightening, I thought of my children—how could a mother of seven do away with herself? I put the stocking down"; and (2) a newspaper man speaking on the "lack of water treatment": "Once I saw an old man fold a piece of paper, make a cup of it and use it to drink his own water. . . . Later while hiding out, I could no longer stand the thirst. I remembered what I had seen the old man doing, and I, too, drank my own water"; and (3) a professor fleeing, after being marked for liquidation, who stated: "Even to my wife who came out to the gate, I did not turn my head but said simply, 'There is no telling when we will meet again. Maybe after a few days, maybe after a few years. Meanwhile we must survive.' Then I left my family, my house and library."

The foregoing accounts are sad, but the people never lost their staunch opposition to the Reds. It is also interesting to note that the South Koreans were learning the Russian language but did not know it. As a law professor stated: "what the word 'dawai'. means or where it originated is not known. However, when Red Soldiers take away the thing that belongs to others, the civilians say that they have been 'dawaied'!" The Reds looted radios, pianos, furniture, equipment, and food under the "dawai" procedure both for home consumption and for shipment to North Korea.

The word "dawai" comes from the Russian language, and simply means "give," but when you say "dawai" it is with the force of authority similar to that of a hold-up bandit who is armed with two six-shooters to enforce his request.

MORRIS BERZON
Boston, Massachusetts

WISE, GEORGE S. *Caudillo: A Portrait of Antonio Guzmán Blanco.* Pp. xvii, 190 New York: Columbia University Press, 1951. $3.00.

The inspiration for this little volume by Dr Wise is a happy one: to study the phenomenon of *caudillismo* as reflected in the career of a typical *caudillo.* The realization is less happy. Guzmán Blanco was Venezuela's best known *caudillo* and one of the more famous ones in all of Latin America. The author promises in his foreword that "We shall see that the various aspects of his rule and the conditions under which he ruled are integrally bound together . . . there are certain features in the rule of this caudillo that manifested themselves again and again in the history of other Latin American countries; and by a detailed analysis of his career we get a more intimate picture of the mechanisms involved than could have been attained by a broad comparative analysis of all or many caudillo regimes in Latin America."

After a treatment of Venezuelan colonial backgrounds and institutional development Dr. Wise discusses in four chapters the career of Guzmán Blanco himself In four succeeding chapters he discusses the "aspects of a *caudillo* regime": ideological irresponsibility, the unqualified use of force, financial chicanery, and personalism. These chapters logically should provide the heart of the study, but that sort of organization inevitably provides a danger—one the author does not entirely succeed in avoiding—namely, that of repetition of what has already been said in the biographical chapters.

The volume contains no clear-cut working definition of either of the terms *caudillo* or *caudillismo.* In a case study of this highly important Latin American phenomenon and of one of such dramatic actors on the political stage that is a regrettable omission. If the author could have projected the elements which conditioned Guzmán Blanco's career into a general interpretation of *caudillismo* as a whole the study would have gained greatly in value.

Several instances of inaccurate or awkward translation occur. *"Derecho de gentes"* (p. 78) should properly be translated as "international law" rather than as "the rights of the people"; the word "colleges" (p. 83) would appear to have been translated from *colegios,* but that is a misleading translation; it is stated (p. 84) that a "decree created a national direction of primary instruction" but if the key word is translated from *dirección* it is again an infelicitous rendering; the author does not need to invert Guzmán Blanco's words (p. 166) and make him say: "the only one who can think am I, and the only one who does think am I."

We need more studies of *caudillos* and *caudillismo* if those leaders and that condition are properly to be understood. Unfortunately this volume, despite much useful information which it contains, does not give us the best sort of model.

RUSSELL H. FITZGIBBON
University of California
Los Angeles

COON, CARLETON S. *Caravan: The Story of the Middle East.* Pp. viii, 376. New York: Henry Holt and Company, 1951. $5.00.

This valuable book by a professor of anthropology is a real vade mecum on the Middle East. It is informative and makes fascinating reading; above all, it is full of learning. It provides a convenient summary of life and culture in nearly all the countries touched by Arab civilization, or where Mohammedanism is the dominant religion.

The general course of the narrative is given in the form of "case studies." Such is the detailed description of the society in Fez, the life in a village (Khunik, in northeastern Iran), or the ways of the Bedouins (the Bedawis of the author) in Arabia. Throughout there is a heavy sprinkling of most recent information, in the text and in footnotes, on many phases of most ancient history. Professor Coon disclaims any attempt to be up to date (p. 342), but he is well aware of new archaeological discoveries and linguistic theories. The story of the rise and spread of Mohammedanism has been narrated many times by others, but its impact on the nomadic and seminomadic Arab is most vividly presented by the author. It was just the type of religion which millions in these vast areas adopted, one that did not disturb the prevailing equilibrium.

Perhaps the best parts of the book (Chapters 11, 13, and 15) deal with the unenviable lot of the poor, especially in Iran. There, and in many parts of the Middle East, no matter how hard a tenant farmer works, his income is never more than a fifth of the crop, and that is barely enough to keep him and his family alive. The solution of that most acute problem, the elimination of widespread poverty in relatively wealthy countries, is the paramount task of our age; it is becoming a categorical imperative.

It would seem perhaps unkind to find shortcomings in such a book, but it is incumbent on a reviewer to point out some of them. Professor Coon thinks that the Moslem civilization anticipated and aimed toward the realization of the "One World." His interpretation of Moslem culture and Moslem dogma places other religions, and especially the Christian religion, on a different level. This point of view is open to serious criticism, but this is not the place. It may be that Oxford (England) was a market town (p. 253) when Moslem universities were in full growth, but it is rather misleading to call certain schools of the Middle East in the Middle Ages universities.

A. O. SARKISSIAN

Library of Congress
Washington, D. C.

BOOKS RECEIVED

BARNES, HARRY ELMER. *Society in Transition.* Pp. xiii, 878. Second ed. New York: Prentice-Hall, 1952. $6.00

BECKER, HOWARD, and HARRY ELMER BARNES, with the assistance of ÉMILE BENOÎT-SMULLYAN and others. *Social Thought From Lore to Science.* Vol. I: "A History and Interpretation of Man's Ideas About Life With His Fellows"; Vol. II: "Sociological Trends Throughout the World." Pp. xxxiv, 790, cx; viii, 791–1178, cxxxv. Washington: Harren Press, 1952. $15 00.

BOSSANO, LUIS. *Los Problemas de la Sociologia.* Pp. 264 Tercera ed. Quito, Ecuador: Imprenta de la Universidad Central, 1951. No price.

BRYSON, LYMAN, LOUIS FINKELSTEIN, HAROLD D. LASSWELL, and R. M. MACIVER (Eds.). *Foundations of World Organization: A Political and Cultural Appraisal.* Eleventh symposium. Papers prepared for the eleventh meeting of the Conference on Science, Philosophy and Religion in Their Relation to the Democratic Way of Life, held at the Men's Faculty Club of Columbia University on Sept. 5, 6, 7, and 8, 1950. Pp. xiv, 498. New York Harper & Brothers, 1952. $4 00.

CARTER, EDWARD W., and CHARLES C ROHLFING. *The American Government and Its Work.* Revision of *The New American Government and Its Work* by James T. Young. Pp. xv, 875. New York: The Macmillan Company, 1952 $6 00.

CARY, M. *A History of the Greek World from 323 to 146 B C.* Pp xvi, 446, 3 maps. Second rev ed New York: The Macmillan Company, 1952. $4.50.

COLE, G. D. H, and A. W FILSON (Eds). *British Working Class Movements: Select Documents 1789–1875.* Pp. xxii, 629. London: MacMillan & Co. (distributed in U. S by The Macmillan Company), 1952. $7.50.

COUFFIGNAL, LOUIS *Les Machines à penser* Pp 157. Paris: Les Éditions de Minuit, 1952. 600 fr.

CRIST, RAYMOND E. *The Cauca Valley, Colombia: Land Tenure and Land Use.* Pp. ix, 118. Baltimore. The Waverly Press, 1952. No price.

CURRAN, J. A., JR *Militant Hinduism in Indian Politics: A Study of the R. S. S.* Pp. 94 mimeo. New York: Institute of Pacific Relations, 1951. $1.50.

DUBOIS, MAURICE. *Ces Enfants qui ont failli.* Contribution à l'étude du chapitre II de la loi du 15 mai 1912. Réflexions sur le problème de la délinquance et de l'inadaptation des enfants et des adolescents. Action judiciaire, éducative et sociale. Pp. 123. Bruxelles: Office de Publicité, Société Anonyme, 1952. No price.

Garvan, Anthony N. B *Architecture and Town Planning in Colonial Connecticut.* A volume in the "History of Art Series" of the Yale Historical Publications. Pp. xiv, 166 New Haven: Yale University Press, 1951. $7 50

Gianello, Leoncio. *La Ensenanza de la historia en la Argentina* Pp. viii, 121. Mexico, D. F.: Instituto Panamericano de Geografia e Historia, Comision de Historia, 1951. $15.00 Mexican.

Glueck, Sheldon (Ed.). *The Welfare State and the National Welfare: A Symposium on Some of the Threatening Tendencies of Our Times.* Pp. ix, 289. Cambridge, Mass.: Addison-Wesley Press, 1952. $3 50.

Heinig, Kurt. *Das Budget.* Dritter Band. Inhalts-, Sach-, und Namenverzeichnis. Pp. xx, 204 Tübingen: Verlag J C. B. Mohr (Paul Siebeck), 1951 Index volume.

Holtzman, Robert S, and A. Kip Livingston with the assistance of Gerald Lewis (Eds.). *Big Business Methods for the Small Business* Pp. xii, 323. New York Harper & Brothers, 1952. $5.00. A collection of papers.

Howe, Mark DeWolfe. *Cases on Church and State in the United States.* Pp v, 393. Cambridge, Mass.: Harvard University Press, 1952. $6.00.

Hubbert, Erin, and Herbert H. Rosenberg. *Opportunities for Federally Sponsored Social Science Research.* Pp. 52. Washington, D. C: The Maxwell Graduate School of Citizenship and Public Affairs, Syracuse University, 1951. No price.

Jaspers, Karl. *Way to Wisdom, An Introduction to Philosophy.* Translated by Ralph Mannheim. Pp. 208. New Haven: Yale University Press, 1951. $3.00.

Kisselgoff, Avram. *Factors Affecting the Demand for Consumer Instalment Sales Credit.* New York: National Bureau of Economic Research (Technical Paper No. 7), 1952. $1.50.

Lasswell, Harold D. *The World Revolution of Our Time: A Framework for Basic Policy Research.* Hoover Institute Studies, Series A, General Studies No. 1. Pp. vi, 66. Stanford, Calif.: Stanford University Press, 1951. No price.

Lehmann, Konstantin. *Die Entstehung der Freiheitsstrasse in den Klöstern des heiligen Pachomius.* Zeitschrift für Rechtsgeschichte. LXVIII. Kan. Abt. XXXVII. Weimar: Verlag Hermann Bohlaus Nachfolger, 1951. No price.

Macdonald, H. Malcolm, Wilfred D. Webb, Edward G. Lewis, and William L Strauss. *Outside Readings in American Government.* Pp. xii, 884. Second ed. New York: Thomas Y. Crowell Company, 1952. $2.95.

McInnis, Edgar, et al. *Ensayos sobre la Historia del Nuevo Mundo.* Pp. xii, 497. Mexico, D. F.: Instituto Panamericano de Geografia e Historia, 1951. $25 00 Mexican.

MacIver, R. M. (Ed.). *Conflict of Loyalties* A series of addresses and discussions in the "Religion and Civilization Series" Pp vii, 150. New York: The Institute for Religious and Social Studies, 1952. $2.00.

Mallory, Walter H. (Ed). *Political Handbook of the World: Parliaments, Parties and Press, as of January 1, 1952.* Pp. 229. New York: Harper & Brothers (for Council on Foreign Relations), 1952. $3.50.

Merton, Robert K., Ailsa P. Gray, Barbara Hockey, and Hanan C. Selvin (Eds.) *Reader in Bureaucracy.* Pp. 464. Glencoe, Ill.: The Free Press, 1952 $5.00.

Moore, Arthur. *Underemployment in American Agriculture.* An Agriculture Committee Report Planning Pamphlets No. 77. Pp. viii, 91. Washington: National Planning Association, 1952. 75 cents

Peacock, Alan T., Ralph Turvey, Hendrik S. Houthakker, Friedrich A. Lutz, and Elizabeth Henderson (Eds.). *International Economic Papers,* No. 1. Translations prepared for the Internation Economic Association. Pp 244. London: Macmillan & Company (distributed in the U. S. by The Macmillan Company), 1952. $3 50.

Pigors, Paul, and Charles A. Myers (Eds.). *Readings in Personnel Administration* Pp xii, 483 New York: McGraw-Hill Book Company, 1952. $4.50.

Pinson, Koppel S. (Ed.). *Yivo Annual of Jewish Social Science.* Volume VI. Pp. 320. New York· Yiddish Scientific Institute—Yivo, 1951. No price.

Schuyler, Robert Livingston, and Herman Ausubel (Eds.) *The Making of English History.* A collection of essays. Pp. xv, 686 New York: The Dryden Press, 1952. $5.60.

Scullard, Howard H. *A History of the Roman World from 753 to 146 B. C.* Pp. xiv, 470. New York: The Macmillan Company, 1952. $5 50.

Silva, Ruth C. *Presidential Succession.* Pp. viii, 213, ii. Ann Arbor: University of Michigan Press, 1951. $3.50.

SPEIER, HANS. *Social Order and the Risks of War.* Papers in political sociology. Pp. ix, 497. New York: George W. Stewart, 1952. $4.75. A book in the "Library of Policy Sciences" edited by Harold D. Lasswell and Saul K. Padover.

THURSTONE, L. L. *Applications of Psychology: Essays to Honor Walter V. Bingham.* Pp. x, 209. New York: Harper & Brothers, 1952. $3.00.

UNITED NATIONS. *Demographic Yearbook 1951.* Third issue. Pp. 608. New York: Columbia University Press, 1951 $7.50.

U. S. CONGRESS. JOINT COMMITTEE ON THE ECONOMIC REPORT. *Monetary Policy and the Management of the Public Debt: Their Role in Achieving Price Stability and High-Level Employment.* Replies to questions and other material for the use of the Subcommittee on General Credit Control and Debt Management. Two parts. Pp. xvii, 632; vii, 633–1302. Washington: Superintendent of Documents, 1952 No price.

VAUGHAN, WAYLAND F. *Personal and Social Adjustment: Foundations of Mental Health.* Pp. xiv, 578. New York: The Odyssey Press, 1952. No price.

Yearbook of International Organizations, 1951–52. Fourth year. Pp. 1229. Brussels: The Union of International Associations, Service Centre for International Non-Governmental Organizations, 1951. $7.00.

INDEX

INDEX

Achten, A., quoted, 172
Adams, Roger, cited, 33
ADEQUACY OF OUR MINERAL FUELS, Robert E. Hardwicke, 55–72
Agriculture
  Canadian exports of products, 196
  crop yields and soil maintenance, 123–127
  experiment stations, 118–119
  improvement of, in Canada, 200
  more prosperous on good land, 110
  production lost through dam construction, 13
  See also Land; Soil
ANDERSON, DEWEY, A Program for the Redwoods, 105–109
Anderson, Dewey, cited, 193
Averitt, Paul, cited, 44
AYRES, EUGENE, International Fuel Economy, 73–78
Ayres, Eugene, cited, 48, 49, 51, 55, 57, 58, 59, 60, 66, 69, 79

Bacon, H. L, 163
Bailey, Reed W., cited, 153
BAKER, JOHN H., The Citizen's Part in Conservation, 20–24
Ball, Max, 69; quoted, 67
BATEMAN, ALAN M, Our Future Dependence on Foreign Minerals, 25–32
BEATTY, ROBERT O, The Conservation Movement, 10–19
BENNETT, HUGH H, Soil Conservation and Floods, 181–188
Bennett, Hugh H, 118, 119, 120, 121
  cited, 127, 184
Berg, Clyde, cited, 70
BERGEN, STEPHEN, Water Supply—The Industrial East, 172–180
Berryhill, Louise R., cited, 44
"BIG" VERSUS "LITTLE" LUMBER OPERATORS IN THE PACIFIC NORTHWEST, Daniel L. Goldy, 93–98
Bingham, R. L, 163
Bitumens
  reserves and possible exploitation of, 70
Black, John D.
  cited, 131, 132, 133, 148, 149
BRADFIELD, RICHARD, Soil Conservation and the Maintenance of Soil Productivity, 118–125
Brannan, Charles F., 150
Buckley, Stuart E., editor, 58, 61, 62
Bureau of Land Management, 4
  administration of grazing lands by, 139–140
  extent of land administered by, 14, 153
  practices of, in disposal of timber, 95–98
  suggested transfer of, from Interior to Agriculture, 154
Burgess, Paul S., 155

Canada
  conservation in Canada
    agriculture, 200
    fish, 200–201
    forests, 199–200
    general policies, 201–202
    minerals, 201
    problems of, 197–198
    question of responsibility for, 198–199
  natural resources of, 196–197
Carhart, Arthur H., cited, 16
Carskadon, Thomas R., cited, 56
Char. use of, for synthetic fuels, 49
Citizen agencies for conservation
  American Forestry Association, 21
  Brandywine Valley Association, work of, 22
  conservation committees of Garden Club of America and National Council of State Garden Clubs, 21
  Conservation Foundation, 21
    studies sponsored by, 156, 157
  Ducks Unlimited, 21
  Friends of the Land, 21
  Izaak Walton League of America, 21
  National Association of Soil Conservation Districts, 17
  National Audubon Society, 20, 21
    educational work of, 23
  National Parks Association, 21
  National Wildlife Federation, 21
  Natural Resources Council of America, 18
  nature of, 18, 21, 24
  personal participation in, 21–22
  Salt-Wahoo Watershed Association, 184–185
  Sierra Club, 21
  Sport Fishing Institute, 21
  Twentieth Century Fund, 127
  variety of goals of, 20–21
  Wild Flower Preservation Society, 21
  Wilderness Society, 21
  Wildlife Management Institute, 21
  See also Engineers Joint Council; National Association of Manufacturers
CITIZEN'S PART IN CONSERVATION, THE, John H. Baker, 20–24
Clapp, Earle H, 85, 105
Clawson, Marion, cited, 153, 154
Cloud-seeding, possibilities of, 164

Coal
  British economy geared to, 75
  carbonization of, 49
  competition of, with other fuels, 65–66
  consumption, relative
    British, 73, 74
    Chinese, 77
    U. S., peaks of, 78
    Yugoslav, 77–78
  conversion of, into liquid and gaseous fuels, 49, 66
  costs of transoceanic deliveries of, 47
  Fischer-Tropsch treatment of, 49, 66
  hydrogenation of, 49, 66
  loss in mining, 59–60
    reduction of, 60
  production, United States, 45, 57
  production, world, 45
  reserves
    British, nature of, 75
    United States, 57, 75
    world, 44
  underground gasification of, 60, 65–66
  U. S. has apparently about half of, 78
  U. S. has exportable quantity, 42
  world requirements of, 42, 44
    projected to 1975, 45–46, 52
  world supply in 1937 and 1950, 46
Commission on Organization of the Executive Branch of the Government (Hoover Commission)
  recommended a Board of Impartial Analysis of Engineering and Architectural Projects, 190
  showed wasteful competition in water development program, 4, 13
COMPARATIVE COSTS OF RESTORATION AND RECLAMATION OF LAND, Paul B Sears, 126–134
Competition in lumber industry
  favorable effects of, 97–98
Compton, Wilson, 85
Congress of Industrial Organizations
  favors dispersion of industry, 192
  favors government control of forest management, 4
  favors valley authorities, 189–191
  insists on labor's rights, 192
  interest of, in outdoor recreation, 193–194, 195
  interest of, in soil and range conservation, 193
  program of, for forests, 192–193
  various elements of policy of, 194–195
CONSERVATION AND WISE UTILIZATION OF NATURAL RESOURCES IN CANADA, H. A. Young, 196–202
CONSERVATION IN 1952, Stephen Raushenbush, 1–9
CONSERVATION MOVEMENT, THE, Robert O. Beatty, 10–19
CONSERVATION OF HYDROELECTRIC POWER, Paul J. Raver, 79–83
Conservation of natural resources
  administrative problems of, 167–168, 170
  an international problem, 34–35
  as a social movement, 11–12, 17–19
  as leading to government control, 2
  defined, 10, 59–60, 79–80, 146
  divergent views regarding, 12, 14, 16, 17, 33–34, 118–121
  forces contrary to, 1–3, 165–166
  ideas basic to, 1, 33
  in Canada, 197–202
  inadequately practiced in western U. S., 170
  is properly linked with development, 163, 165, 169
  money cost of, 4, 5
  need for, questioned, 2–3
  need for studies regarding, 8–9
  public interest in, 20, 24
  technological possibilities of, 164–165
  through improved production methods, 60–65
  unpopular, 163
  weakness of state and local agencies for, 157, 160
  work of government agencies, 4
  See also Citizen agencies for conservation; Government agencies for conservation
Cooke, Morris L., 155
Cooke Commission, *see* Water Resources Policy Commission
Coolidge, Susannah, 126
Cummings, R. W., cited, 124

DANA, SAMUEL T., Private Forestry in Transition, 84–92
Davis, Joseph S., cited, 156
Dewhurst, J. Frederic, editor, 56, 70
Doak, T. E., cited, 123
Douglas, Helen Gahagan, cited, 193
Drucker, Peter F., quoted, 71
Duff, D. M., cited, 45

ECONOMIC ANALYSIS OF LAND USE ON THE WESTERN RANGES, M. M. Kelso, 135–145
Education for conservation of natural resources, 20, 22–23
  needed, 24, 170–171
Eldridge, W. J., cited, 180
Eliassen, Rolf, cited, 177, 178
Energy
  consumption
    Russian, 77
    United States, 42, 55, 77
    world, 42–44

  related to economic opportunity and standard of living, 55–56, 78, 79
  sources, 42, 43–44
    categories of, 79
    comparative heat values of, 42, 50, 56
    competition among, 56–57, 59, 65–67
    hydroelectricity, 59
    nuclear energy, 43, 57, 59
    oil shale, 43
    solar energy, 43, 57, 78
    water power, 80
    wind and tides, 57
    world production of, 44–45
  U. S. has adequate supply of, 79
  See also Hydroelectric power; National policy for energy resources; Water power
Engineers Joint Council
  composition of, 12
  lists large industrial water users, 176
  views of, re water policy, 12, 157–158
Exports of Canadian natural resources, 196–197

Fischer-Tropsch process of treating coal and natural gas, 49, 66, 67
Fish
  Canada's production and conservation of, 196, 200–201
  See also Wildlife
Floods
  distribution of flood damage, 182
  flood control
    citizen participation in, 184–185, 186
    dollar benefits from, 186–188
    expenditures for, 150
    principles of, 188
    soil and forest conservation necessary to, 5, 155, 181, 183–184
    suggested shifting of responsibility for, 150
    variety and co-ordination of efforts for, 181–188
    work being done, 185–188
  flood protection
    question of national payment for, 5
  Kansas and Osage River floods of 1951, 5, 182
Forest Policy for the Years Ahead, Hardy L. Shirley, 110–117
Forest Service, *see* United States Forest Service
Forests
  area of land suited to, 90, 110, 112, 152
  Canada's position in, 196, 199–200
  classification of forest lands, 114–115
  conservation
    beginning of, 100
    incentives for, 98
  devastation of, 99–100
  government ownership and/or administration
    desirability of, 91
    extent of, 14, 85, 91, 94
  importance of, to U S. economy, 84, 89–90, 93, 100, 111
  management
    program of CIO, 192–193
    progress in, 112
    proposals for management policy, 112–117
    weaknesses of, 112
  private forestry
    accomplishments of, 86–88
      motivation of, 88–89
    extent of private ownership, 84, 94
    need for improvement in, 89
    public co-operation in
      fields of, 90, 101
      proposed, 84
    public regulation of
      necessity for, 84, 90–91, 100–102
      opposed by lumber industry, 4, 100
    responsibility of owners, 15, 84, 109
    self-regulation in, 85–86, 101, 103–104
  question of end use of, 8
  question of timber famine, 16
  redwood forests
    depletion of, 105
    extent and character of, 105
    proposed program for, 105–109
  relation of, to other natural resources, 15–16, 111–112
  timber resources, 93–94
  world situation in, 111
  See also Lumber industry; Pulp and paper industry; Tree farms
Frank, Bernard, cited, 191, 194
Free initiative
  promotes national well-being, 56, 71–72
Fuel Complex, The: A Projection, George A. Lamb, 42–54
Fuels, *see* Coal; Energy; Mineral fuels; Natural gas; Petroleum; Shale oil

Garnsey, Morris E, Water: West, 163–171
Gas, *see* Natural gas
Geological Survey, *see* United States Geological Survey
Goldy, Daniel L., "Big" Versus "Little" Lumber Operators in the Pacific Northwest, 93–98
Gonzalez, Richard J , cited, 55
Good, Dorothy, editor, 58
Government agencies for conservation
  Army Engineers, 12
    competition of, with Bureau of Reclamation, 4, 5–6, 168, 190
    estimates cost of conservation and development, 127
    work of, in flood protection, 182

Bureau of Agricultural Economics
  suggested addition to functions of, 150
Bureau of Plant Industry, Soils, and Agricultural Engineering
  suggested additions to functions of, 150
  views of, 120
Bureau of Reclamation, 12
  competition of, with Army Engineers, 4, 5–6, 168, 190
  irrigation goals of, 129
  study conducted by, 128
conflicts between, 4, 5–6, 167, 168, 190
Inland Waterways Commission, 156
interstate agencies concerned with water pollution, 179
question of concentration of power in, 154
United States Fish and Wildlife Service, 17
  administers 4 million acres, 14
United States Park Service
  administers 16 million acres, 14
views of, regarding conservation, 33
See also Bureau of Land Management; Production and Marketing Administration; Soil Conservation Service; United States Forest Service; United States Geological Survey; Water Resources Policy Commission
Government control
  of energy-resource industries, not desirable, 71–72
  of forests and lumbering
    favored by CIO, 4
    question of, 4, 100
  of water resources development, question of, 12–13, 158–160, 168
Government funds for conservation
  not based on adequate information, 8
  question of social gain from, 5–6
Graves, Henry S, 84; cited, 113
Grazing lands
  administration of
    by Bureau of Land Management, 139–140
    by Forest Service, 138–139
    by private and public firms, 136–137
  economic analysis of use of, 135–145
  extent of government ownership and/or administration of, 14
  interest of CIO in, 193
  natural environment, the, 136
  operators seek control without responsibility, 14
  private versus public ownership of, 142–143
  property environment, the, 137–138
  public landlord-private tenant relations, 143–144
Greeley, William B., 101; cited, 113
Ground water
  depleted in Central Valley, 169
  estimated use of (1950), 175
  important for irrigation, 167
  investigations needed re sources of, 180
  survey of problems of, 156
Gulick, Luther Halsey, cited, 113, 152
Guy, David M, quoted, 159

HARDIN, CHARLES M., A Rounded Land Conservation Program, 146–154
Hardin, Charles M., cited, 146, 154
HARDWICKE, ROBERT E., Adequacy of Our Mineral Fuels, 55–72
Hardwicke, Robert E., cited, 61, 62, 69
Harper, Sinclair O., quoted, 158
Hasse, R L, 163
Heady, Earl L., cited, 132, 133
Hines, L Gregory, cited, 127
Hoover Commission, *see* Commission on Organization of the Executive Branch of the Government
Hopkins, Cyril G, cited, 119
Howson, L. R, cited, 177–178
Hydroelectric power
  capacity
    in Canada, 196–197
    of Arkansas-White-Red River Basin, 169
    of Central Valley of California, 168
    of Colorado River Basin, 167
    of Columbia River Basin, 170
    of Missouri River Basin, 168
  co-ordination of plants, 82
  development of
    favored by CIO, 190, 191
    versus other values, 191–192
  importance of, to U S. economy, 82–83
  increasing use of, 83
  production and supply of, 59
  savings accomplished by, 81–82
  See also Water power

Indians (U. S.), injustice to, 191
INTERNATIONAL FUEL ECONOMY, Eugene Ayres, 73–78
Iran
  production and use of petroleum in, 76
  size of, 76
Iron ore
  exploration and exploitation of reserves, 35–38
  milling and metallurgical improvements, 36–37
  production of, in Canada, 196
  reserves of, domestic and foreign, 35–36, 38
  scarcity of, 28
Irrigation
  capacity
    of Central Valley of California, 168
    of Missouri River Basin, 168
  cost of, 128–129, 132
  importance of ground water for, 167
  question of economic feasibility of, 128–130
  who pays for, 5, 126, 128

Jevons, Stanley, 75
Jones, Lewis Webster, 155

Kapp, K. W., cited, 180
Kellogg, Charles E, 118; cited, 148, 149
KELSO, M. M., Economic Analysis of Land Use on the Western Ranges, 135–145
Keynes, John Maynard, 198
Kiefer, Maxine, cited, 132, 133

Labor
  advocates benefit payments for good forest practices, 113
  See also Congress of Industrial Organizations
LABOR LOOKS AT CONSERVATION AND DEVELOPMENT, Anthony Wayne Smith, 189–195
LAMB, GEORGE A., The Fuel Complex: A Projection, 42–54
Lamb, George A, cited, 7, 51, 66
Land
  areas suited to forests, 90, 110, 112, 152
  conservation
    administration of payments for, 151–152
    costs of, 152
    meaning of, 146
    objectives of, 148–149
    Production and Marketing Administration program for, 146–147
    program of TVA and agricultural colleges for, 148
    Soil Conservation Service program for, 146
    suggested program for, 150–154
  interrelated with water, 153, 166, 167, 180
  irrigation lands, classification of, 128–129
  reclamation of new land
    costs of, 127–131, 132
  restoration of old land
    forms and cost of, 131–133
    must be done by government, 127
    taxpayers contribute to, 126, 127
  uses of, 127
  wise utilization of, 110
  See also Agriculture; Forests, Grazing lands; Public lands; Soil
Langbein, W. G., cited, 173
Lawes, John, 118
Legislation
  designed to improve forestry practices, 15, 101
  proposed, re water policy, 160–162
  re conservation, far advanced in U. S., 20
  re water pollution control, 178–179
  Reclamation Act of 1902, purposes of, 5–6
Leopold, Aldo, cited, 18
Lewis, R. D., cited, 126
Livestock farming
  Canadian exports of live cattle, 196
  promotes soil maintenance, 123
Lowry, Worth, 189
Lumber industry
  Canadian exports of lumber, 196
  cutting practices
    character of, 4, 89, 102, 105
    overcutting, 15, 93, 94
      leads to government ownership, 94
    question of government control of, 4
    social cost of bad practices, 4, 106–108
  favorable effects of competition in, 97–98
  history of, 99–100
  industrial rank of, 111
  monopoly practices in, 94–96
    program to eliminate, 96–97
  opposes government control, 4, 100
  sustained-yield capacity, 93–94
  See also Forests; Pulp and paper industry, Tree farms

Maass, Arthur, cited, 154, 160
McElroy, D. L, cited, 51
MacGowan, Charles, 192
MacKichan, Kenneth M, cited, 174, 175
McKinley, Charles, cited, 153
McQuery, Elton, 168
Malthus, Thomas Robert, 166
Manganese
  foreign sources of, 28
    extent of dependence on, 26, 28
  required for steelmaking, 28–29
  world reserves of, 39–40
Marschak, Jacob, editor, 43
MEYERHOFF, HOWARD A, What Is Involved in Metals Conservation Today? 33–41
Middle East
  birthplace of civilization, 76
  geographic characteristics of, 76
  rich in petroleum, 76–77
Mineral fuels
  adequate supply at reasonable prices promoted by free initiative, 56, 71–72
  reserves of (U. S.), 57–59
  25-year projection of, 44–54
  See also Coal; Energy; Natural gas; Petroleum; Shale oil
Minerals
  Canada's output and conservation of, 196, 201
  conservation
    elements in, 40–41
    receives minor attention, 10
    through use of electric processes, 81–82
  dependence on foreign sources for
    during World War II, 25–26, 28
    estimated for 1975, 28
    in various minerals, 28–30
    related to U. S. foreign policy, 27, 30–31
  estimated U. S. reserves of, 26–27
  exploitation of foreign, 7, 36
  foreign sources of, 28, 30–31

  increased demand for, 25–26, 27
  intensive exploration and exploitation of, 28, 29
  measures suggested regarding, 6–7, 31–32
  ratio of production to consumption of, 26, 29
  related to industrialization and national progress, 25
  Russia's situation in, 31
  stockpiling of, 39, 40
  substitutes for, 29, 30
  technological developments regarding, 29
  U S. and British Commonwealth complementary in, 30
  wiser use of, 6, 29
  See also Coal; Iron ore; Manganese; Petroleum; Tin
Mining
  improved methods in, reduce loss, 60
  marginal, questionable economy of, 38–40
  of coal and petroleum
    subject to economic feasibility, 59–60
Modley, Rudolf, cited, 56
Morris, Samuel B., 155
Murphy, Blakely M., editor, 62
Murray, James E, 189
Murray, Philip, 189, 190, 191
Murray, William G., cited, 132, 133
Myers, W. I, cited, 123

National Association of Manufacturers
  opposes valley authorities, 159
National parks and monuments
  interest of CIO in, 193
  private ownership and use within, 14–15
National policy for energy resources
  should be based on free initiative, 56, 71–72
National policy for forest management
  proposals regarding, 112–117
National policy for water resources
  conflicting views regarding, 12, 157–159
  growth of, 155–156
  principles of planning, 156–157
  question of federal control, 12–13, 158–159
  question of financial feasibility, 157–158
  unified treatment
    achieved in Arkansas-White-Red Basin, 169
    needed, 5, 156, 160, 165
  valley authorities
    favored by CIO, 189
    nature of, 12
    need for, 170
    opposition to, 12, 159
  See also Water Resources Policy Commission
Natural gas
  defined, 60
  Fischer-Tropsch treatment of, 67
  function of, 61
  heat value of, 42
  loss and conservation in production of, 60–61, 66–67
  reserves (U. S), 58
  world requirements of, 42
  world supply in 1937 and 1950, 46
Natural resources
  complacent attitude toward supplies of, 33, 34
  depression treatment of, 3–4
  drained by war and depression, 1, 35
  of Canada, 196–197
    world significance of, 197
  supplemented by imports, 2
  supply, affected by scientific advance, 1–2
  West contains most of unutilized resources of U. S., 164
Neahr, W. G., 163
Nelson, Wesley R., cited, 164
Netboy, Anthony, cited, 191, 194

O'Brian, C. L., cited, 51
Oil shale
  a promising material, 43
  a relatively expensive source of fuel, 76
  reserves of, U. S., 70
  U. S. has apparently more than half of, 78
  See also Shale oil
Oils
  synthetic, making of, 49
  See also Petroleum; Shale oil
Olds, Leland, 155
Olmsted, Frederic E, 84
Osborn, Fairfield, 118
OUR FUTURE DEPENDENCE ON FOREIGN MINERALS, Alan M Bateman, 25–32

Pearson, F. A., cited, 123
Petroleum
  alternate raw materials, 70
  conservation methods, 7
  consumption
    downward trend in
      Iran, 76
      U. S. and other countries, 73–74
    relative in
      Canada, 77
      India and Pakistan, 77
      United States, 73, 74
  costs of transoceanic deliveries of, 47
  heat value of, 42
  price of, as affecting Europe, 8
  production
    Iranian, 76
    loss and conservation in (U S.), 60, 61–65, 68
    peak, estimated
      Middle East, 76
      U S. and world, 48

    regulation of (U. S.), 62–64
    U. S. and world, 45
    world distribution of, 77
  question of end use of, 7
  relative capacity for use of, 74–75
  reserves
    Canada, 196
    Middle East, 76
    United States, 57–59
      finding of, 67–69
      magnitude of, 75
  situation in 1975, forecast, 48–49
  social effects of estimated shortage of, 7
  U. S. supply insufficient, 42, 75
  world distribution of, 77
  world requirements of, 42, 43–44
    projected to 1975, 45–46, 51–52
  world situation in, 75–76
  world supply in 1937 and 1950, 46
Pick-Sloan plan for the Missouri Basin, 13, 168
  opposed by CIO, 190–191
Pick-Straus plan for the Columbia Basin
  opposed by CIO, 191
Pinchot, Gifford, 1, 16, 17, 100, 192
  cited, 113; quoted, 84
Pollution control
  demand for, 178
  growth of sewage treatment, 178
  industrial responsibility for, 179–180
  interstate agencies concerned with, 179
  lack of facilities for, 177
  measures for, 178–179
  money cost of, 14, 178
  See also Stream pollution
Population increase (U. S.)
  disproportionate increase likely in West, 163
  estimated, 16, 111, 156, 164
  rate of, 177
  since 1900, 177
Population pressure on natural resources, 6, 16, 25, 111, 156, 163–164, 166
Power, *see* Energy; Hydroelectric power; Water power
Pratt, Wallace E., editor, 58
PRIVATE FORESTRY IN TRANSITION, Samuel T. Dana, 84–92
Production and Marketing Administration
  conflict of, with Soil Conservation Service, 147
  program of, for land conservation, 146–147
PROGRAM FOR THE REDWOODS, A, Dewey Anderson, 105–109
Public lands
  extent, use, and administration of, 14–15, 153
  See also Forests; Grazing lands
Pulp and paper industry
  Canadian production and exports of woodpulp and newsprint, 196
  opposes government control, 4
  paper, industrial rank of, 111
  practices good forestry, 89
  See also Lumber industry
Purcell, Margaret R
  cited, 128, 129, 130, 131, 132
Pursglove, Joseph, Jr., cited, 51

Ranges, *see* Grazing lands
RAUSHENBUSH, STEPHEN, Conservation in 1952, 1–9
Raushenbush, Stephen, cited, 113, 131, 132, 193
RAVER, PAUL J., Conservation of Hydroelectric Power, 79–83
Raver, Paul J., quoted, 82–83
Raw materials, *see* Natural resources
Recreation, outdoor
  interest of CIO in, 193–194, 195
Reistle, Carl E., Jr., cited, 68, 69
Renne, Roland R., 155
Roosevelt, Franklin D., 119, 189
Roosevelt, Theodore, 1, 17; quoted, 156
ROUNDED LAND CONSERVATION PROGRAM, A, Charles M. Hardin, 146–154
Russell, John, 118
Russia
  consumption of energy in, 77
  petroleum situation in, 77

Salter, Robert M., 118, 120; cited, 126
Sandusky, Arthur A, cited, 55
Sauer, Elmer L., cited, 131, 132
Scarlott, Charles A., cited, 48, 49, 57, 58, 59, 60, 66, 69
Schultz, Paul R., cited, 66
Schultz, T. W., cited, 148
Schurr, Sam H, editor, 43
SEARS, PAUL B., Comparative Costs of Restoration and Reclamation of Land, 126–134
Selznick, Philip M., cited, 148
Sewage treatment, *see* Pollution control
Shale oil
  probable production of, by 1975, 49, 52
  See also Oil shale
Shipping rates (ocean) for fuel, 47
SHIRLEY, HARDY L., Forest Policy for the Years Ahead, 110–117
Silcox, F. A., 86
Slipher, J. A., cited, 126
SMITH, ANTHONY WAYNE, Labor Looks at Conservation and Development, 189–195
SNIDER, ROBERT G., The Work of the President's Water Resources Policy Commission, 155–162
Social and political philosophies
  as factors in national progress, 56, 71–72
Soil
  and water are interdependent, 153, 166, 167, 180
  building and depletion of, 121, 126–127

building of, through Krilium, 164
conservation of, 17
citizen responsibility for, 183
divergent views regarding, 118–121
necessary to flood control, 5, 155, 181, 183–184
value of, 183–184
see also Soil Conservation Service
erosion
causes of, 148
damages of, 167, 183
efforts to combat, 119–120
linked with floods, 181, 183
plant nutrients in, 121–123
productivity
crop yields and, 123–127
maintenance of, 118–119, 122–125
soil scientists, specialization of, 118
See also Land
SOIL CONSERVATION AND FLOODS, Hugh H Bennett, 181–188
SOIL CONSERVATION AND THE MAINTENANCE OF SOIL PRODUCTIVITY, Richard Bradfield, 118–125
Soil Conservation Service, 4, 17
conflict of, with Production and Marketing Administration, 147
establishment of, 119
heavily dependent on congressional appropriations, 193
program of, 146
studies by, 127–128, 130, 184
suggested transfer of functions of, 150
survey by, of flood damage in July 1951, 182
views of, 120
Sporn, Philip, cited, 43
Standard of living (U. S.)
factors in, 55–56
STEVENS, T. D., Tree Farms Versus Regulation, 99–104
Stewart, Arthur D., cited, 52
Stream pollution
a national disgrace, 194
extent of, 14, 177
sources of, 13–14
See also Pollution control
Stuart, R. Y., 85
Synthetic oils, *see* Oils

Tannenbaum, Frank, quoted, 71
Taylor, Carl C., cited, 11
Technology conserves natural resources
through cloud-seeding, 164
through diversion of water resources, 164–165, 168, 169, 170
through improved production methods, 60, 65–70
through Krilium for soil rebuilding, 164
Teeters, Robert D., 126
Thomas, Harold E., cited, 156, 174
Thompson, Ernest O., cited, 69
Thorne, C. E., 119
Timber, *see* Forests
Timmons, John F., cited, 132, 133
Tin
elements in conservation of, 29, 40
foreign sources of, 28
dependence on, 28, 29
Tree farms
a profitable business, 103
alternative to regulation of lumber industry, 103–104
defined, 86
goal of, 102
inauguration of movement, 86, 102
number and distribution of, 86, 103
organizations concerned with movement
American Forest Products Industries, 86, 102
National Lumber Manufacturing Association, 102
regional sponsors, 102
system of, 102–103
TREE FARMS VERSUS REGULATION, T. D. Stevens, 99–104
Truman, Harry S., 190, 191

United States Forest Service, 4, 84–85, 89, 91, 100
administration of grazing lands by, 138–139
"discriminatory" practices of, 95–96
extent of land administered by, 14, 153
proposals of, for forest management, 113–114
survey of cutting practices by, 101–102, 105, 106
United States Geological Survey made estimate of industrial use of water, 175

Victoria, Queen of England, 73
Vogt, W. M., 118

Wallace, Henry A., 85
Wallace, Tom, 165; quoted, 163
Walpole, Horace, 78
Walther, J. V., 163
Water power
comparative utilization of, 44, 80
conservation of, meaning of, 79–80, 82
facilities more than pay for themselves, 128
government development of, desirable, 80–81
savings accomplished by, 81–82
world supply in 1937 and 1950, 46
See also Hydroelectric power
Water resources
causes of local shortages, 174, 176–177

Central Valley of California, 168–169
Colorado River Basin, 167
Columbia River Basin, 169–170
  proposed Columbia Valley Authority endorsed by CIO, 191
dam building projects
  cause losses through agricultural nonproduction, 13
  Hells Canyon Dam, 82
  Hungry Horse Dam, 82
  importance of, 82–83
  money cost of, 13
  St. Lawrence Seaway and Power Project, 83
  Tuttle Creek Dam, 13
  waste and duplication in, 4, 13
depletion of, by silt, 153
diversion of, 164–165, 168, 169, 170
importance of, to the national economy, 167, 168, 170, 172
increased and increasing use of, 156, 176
interrelated with land, 153, 166, 167, 180
interstate conflict regarding, 167
Missouri River Basin, 167–168
  conservation program for, 4–5
    estimated benefit of, 187–188
    fallacy of, 13
    money cost of, 13
  Council of State Governments proposal for, 168
  proposed Missouri Valley Authority endorsed by CIO, 189–191
precipitation and runoff
  as affected by land use, 183
  in eastern U. S., 173–174
question of efficiency in conservation of, 4–5
research needed regarding, 180
reuse of, 174–175, 180
Rio Grande Basin, 166
sufficient for increased use, 156, 172, 174
uses of, 12, 81, 174–175, 182
watershed is basic unit of, 5, 156, 172–173, 184–188
See also Floods; Ground water; Irrigation; National policy for water resources; Pollution control; Stream pollution; Water Resources Policy Commission
Water Resources Policy Commission (Cooke Commission)
  emphasizes sedimentation control, 153
  emphasizes unified watershed work, 4–5
  recommendations of, 160–162, 165–166
    criticisms of, 157–159, 190
  structure, function, and procedure of, 155
WATER SUPPLY—THE INDUSTRIAL EAST, Stephen Bergen, 172–180
WATER: WEST, Morris E. Garnsey, 163–171
Watts, L. F , 91
Weiss, M. D., cited, 178–179
Wengert, Norman, cited, 148, 153
Weston, R. F., cited, 178; quoted, 179
WHAT IS INVOLVED IN METALS CONSERVATION TODAY? Howard A. Meyerhoff, 33–41
White, Gilbert F , 155
Wildlife
  in conflict with other values, 17
  pressures upon, 16, 22
  See also Fish
Winters, Robert K., editor, 113
Wolman, Abel
  cited, 175; quoted, 174, 176, 177
Wood, J. E , 163
Wood, *see* Forests; Lumber industry; Pulp and paper industry; Tree farms
Wooten, H. H.
  cited, 128, 129, 130, 131, 132
WORK OF THE PRESIDENT'S WATER RESOURCES POLICY COMMISSION, THE, Robert G. Snider, 155–162
Wright, Wilbur and Orville, 164

YOUNG, H. A., Conservation and Wise Utilization of Natural Resources in Canada, 196–202

Zimmermann, Erich W
  cited, 55, 56, 57, 59, 65

POLITICAL SCIENCE BOOKS FROM **OXFORD**

Pioneers of Russian Social Thought

Studies of Non-Marxian Formation in 19th Century Russia and of its Partial Revival in the Soviet Union

By RICHARD HARE. "Two cultural currents, Western and Slavophile, come to life in lively profiles of the most prominent representative of both sides. . . . More than an important volume on history, this is a highly topical and instructive work in the best sense. It throws a good deal of light on the enigma of Stalinist Russia."—*N Y. Times Book Review.* Illustrated. $4.50

Principles of Social and Political Theory

By ERNEST BARKER. A penetrating examination of the fundamental principles on which the existence of Society and the State is based. The discussion of collectivism *versus* individualism today will be of particular interest to everyone concerned with the shape of modern society. $5.00

PRINCIPLES AND PROBLEMS of American National Government

By JOHN M. SWARTHOUT and ERNEST R. BARTLEY. An introduction to the government of the United States which stresses the why as well as the *how* of the development of the Constitution, public opinion, representation and functions of national government. The lively, straightforward style and sustained awareness of the undergraduate audience make the complex subject of government easily understandable. Illustrated. $4.25

Hobbes and His Critics

A Study in Seventeenth Century Constitutionalism

By JOHN BOWLE. This first systematic account of the contemporary criticism Hobbes provoked reveals how essential this context is to a full understanding of his challenge to the tradition of divine sanction for the state. $2.75

Elements of Democratic Government

By J. A. CORRY. This well-known presentation of democratic governments in action has been completely revised and greatly enlarged. It contains new material on the study of Government, Civil Rights, Democratic Trends and International Politics, with special emphasis on the contrast between dictatorships and basic democratic principles. New edition. $4.50

At all bookstores

OXFORD UNIVERSITY PRESS
114 Fifth Avenue, New York 11, N. Y.

Publishers of Fine Books for over Four Centuries